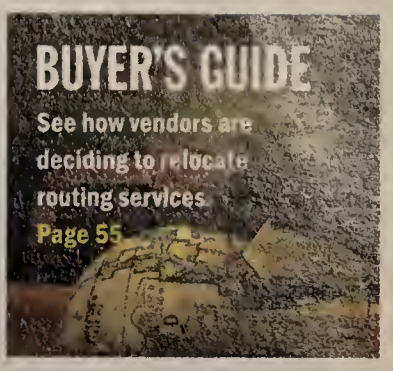
AUGUST 28, 1995 VOLUME 12, NUMBER 35

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING



Cabletron packs ports into its high-end switching hub

By Jodi Cohen
Rochester, N.H.

Customers pushing the limits of Cabletron Systems, Inc.'s top-of-the-line MMAC-Plus hubs may find relief in next month's announcement of two modules that will more than double the port density of the switching hubs.



United's Ken Cieszynski *says new modules are key to keeping his MMAC active.*

According to Cabletron officials, the company will roll out 24-port Ethernet and dual-port Fiber Distributed Data Interface switching modules, both of which will attach to the Multi Media Access Center-Plus' high-speed Internal Network Bus (INB). The boards, which will be demonstrated at NetWorld+Interop in Atlanta next month, require only a single slot in the chassis and boast a forwarding rate of 750,000 packet/sec.

The only segment switching modules available today for the MMAC-Plus' 2G bit/sec INB are a 12-port Ethernet module that takes up two slots and a two-port FDDI dual-slot switch, each handling 150,000 packet/sec.

Ken Cieszynski, staff engineer at United Air Lines, Inc. in Chicago, said the new switching modules are crucial to extending the life of his 14-slot MMAC-Plus. "If [Cabletron] kept making modules that take up two slots, we'd have to

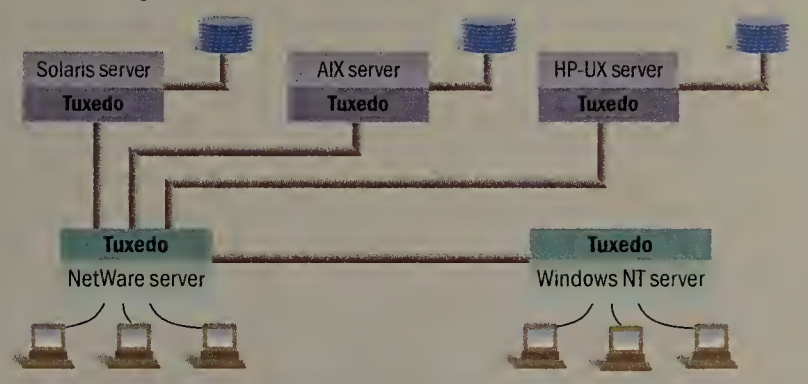
See **Cabletron,** *page 82*

Novell to dress up Tuxedo

Vendor will pitch TP monitor as key middleware technology within its SuperNOS plan.

NETWARE SERVICES FOR NT AND UNIX

Novell will position Tuxedo as middleware, giving users access to NetWare and Windows NT LANs via a single logon as well as access to production servers running Unix.



By Kevin Fogarty
Orem, Utah

Novell, Inc. is getting ready to pull its Tuxedo transaction processing monitor out of the closet and position it as a key middleware technology for tying Windows NT, Unix and mainframe systems into NetWare networks.

The Tuxedo strategy is expected to be outlined next month at the NetWorld+Interop show in Atlanta as part of Novell's broad SuperNOS plan to combine the functions of NetWare and Unix.

"Tuxedo is one of the only technologies that lets people build distributed applications that are OS-agnostic," said Sheldon Laube, Novell's chief technology officer. "We have a lot of clients who have NT and AIX, and they want to be able to build applications across those systems. This will help them do that."

See **Tuxedo,** *page 82*

Conference goers find DCE alive and kicking

Users say they have nowhere else to turn; IBM, Digital, others roll out new products.

By John Cox
Boston

The OSF Distributed Computing Environment (DCE) has always been something that talked better than it walked. But announcements at last week's user conference suggest DCE may finally be finding its legs.

The announcements ranged from the availability of DCE on Microsoft Corp.'s Windows NT operating system, to a new DCE practice at a major consulting firm, to an aggressive money-back guarantee from a tools vendor that promised a refund if its engineers couldn't adapt a customer's existing client/server application to DCE within a week.

At the same time, IBM said it will release its DCE Distributed File Service on MVS in September, which will let MVS hosts participate as DCE resources in a distributed computing environment. By year-end, the company will start beta-testing the DCE security server on MVS, with plans to integrate its widely used Resource Access Control Facility (RACF) host security system with DCE security. Also in September, a new release of AIX will incorpo-

See **DCE,** *page 84*

Auto giants rev up new IP net to link suppliers

By Ellen Messmer
Detroit

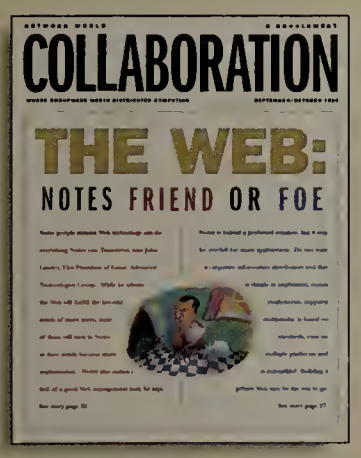
The Big Three automakers next month will unveil plans for a TCP/IP transport network that will link thousands of suppliers, but a fight over an E-mail standard has left the industry divided.

The AUTONET Exchange Network to be proposed by Chrysler Corp., Ford Motor Co. and General Motors Corp. at the Auto-Tech '95 conference here would let suppliers in the Detroit area exchange data over a private IP network with controlled access to and from the public Internet.

Until now, suppliers have been forced to use multiple value-added networks or proprietary formats to meet the various electronic data interchange, CAD and mail demands of Chrysler, Ford and GM.

The AUTONET plan, de-

See **Auto giants,** *page 83*



Can Web technology do everything Lotus Notes can? Well, no. But it *can* do an awful lot. See *Collaboration*.

Follows page 44.

Data warehouse demands straining corporate nets

By Barb Cole

Data warehouse architects are becoming victims of their own success.

With warehouse usage exploding, architects must now wrestle with problems involved in extending warehouse access across the enterprise and making it easier to mine information from these specialized databases.



Los Angeles Times' Rich Thayer *has opted to segment his company's data warehouse for better performance.*

MICHELE A. SMITH

Data warehouses are popular because they enable companies to cull data from operational databases and make it available to end users looking to run decision support and other applications. The increasingly competitive business climate and the elimination of many middle management jobs have turned more and more of these users into decision makers.

Database companies such as IBM, Informix Software, Inc., Oracle Corp. and Sybase, Inc. have responded by assembling data warehouses around their core database systems.

A major trend in data warehousing is to give more users access to these large storehouses of information.

"We've gone from 30 users to about 600, and our [Sybase] database has grown to about 50G bytes," said Barbara Hirstius, information technology consultant for data warehousing administration at Entergy Corp.

See **Warehousing,** *page 83*

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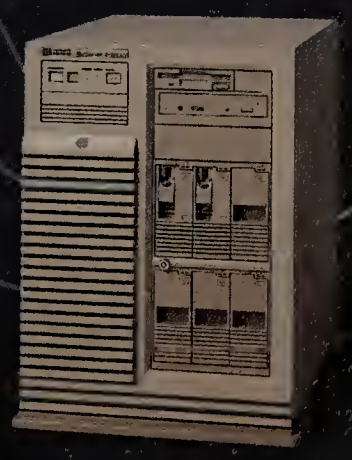
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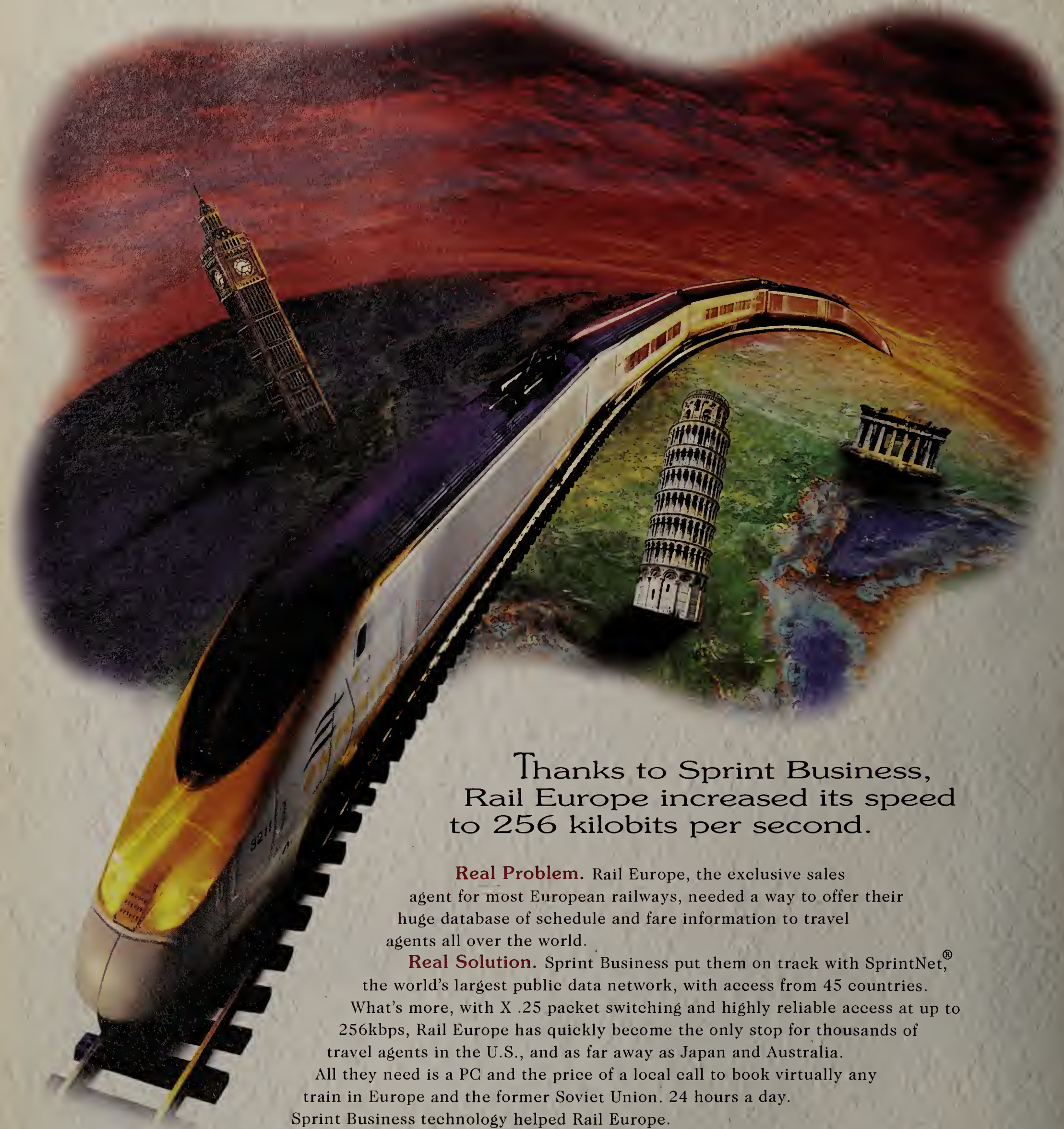
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Contents



Windows 95 *circus comes to town, bringing Hollywood hoopla but prompting caution from corporate users. Page 6.*

Briefs, August 28, 1995

Built for speed

■ Network Appliance Corp. of Mountain View, Calif., next week will introduce NetApp F330, the company's fastest file server yet. The system, which is based on a proprietary operating system, boasts throughput of 1,143 Network File System operations in fewer than 10 msec. The server, designed to run in product development, financial services and other demanding network environments, starts at $48,000.

Modem merger madness

■ Boca Research, Inc. of Boca Raton, Fla., last week called off negotiations to acquire modem standard-bearer Hayes Microcomputer Products, Inc., citing "fundamental differences in the management of the two companies."

Boca announced plans to acquire Hayes earlier this summer, despite rumors that the company was developing alternative plans to get out from under Chapter 11 bankruptcy protection.

Gotta serve somebody

■ Novell, Inc.'s products do not support Windows 95 yet, but its support lines do. The company's NetWire CompuServe forum and World-Wide Web site will both have downloadable patches, installation and troubleshooting guides, and technical documents, as well as a searchable database of all known integration issues between Windows 95 and Novell products.

Smart money



■ The Financial Services Technology Consortium, a group of 65 banks, technology vendors, government agencies and others, last week said it intends to develop a PCMCIA and smart card specification for electronic checks that could be accepted by retailers in lieu of paper checks.

Frank Jaffe, Bank of Boston senior systems consultant and electronic check project manager for the consortium, said the group expects to test an implementation of the specification this fall and publish it early next year.

Nashoba soups up switch

■ Start-up Nashoba Networks, Inc. of Littleton, Mass., last week announced the first Fiber Distributed Data Interface uplink module for a token-ring switch. The module for Nashoba's Concord switch is priced at $12,500 and includes four token-ring ports as well as an FDDI connection. The module will ship in November.

Two-for-one from SMC

■ Standard Microsystems Corp. of Hauppauge, N.Y., last week unveiled two PCI adapters on one card, allowing end users to boost network performance for less than the cost of buying two separate cards. EtherPower2 will allow users to double net bandwidth while saving a valuable slot in the server. EtherPower2 is priced at $286 and is available now.

Bye-bye Bill

■ Bill Warner, vice president of IBM's SystemView product line, announced his retirement last week. Warner headed up some high-profile net and systems management initiatives throughout the years.

His retirement will be effective Oct. 1, when Al Zollar, currently head of IBM's Cary, N.C., lab, will take over.

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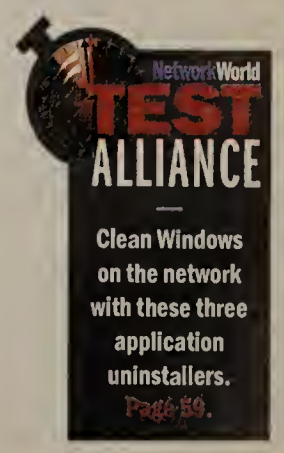
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NetworkWorld's Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.

NT opens corporate doors for Win95

Net managers say the OS and NOS will be equal partners in company evaluations.

By Peggy Watt
Redmond, Wash.

Windows 95 may be getting all the attention now, but the new operating system is being forced to share the spotlight with sibling Windows NT at many companies that are evaluating the products as a pair.

"We won't jump into anything too soon; we're still evaluating Windows 95," said Larry Blakeman, a network manager with The Dun & Bradstreet Corp. in Hartford, Conn. But the company's recent commitment to Windows NT and its use of Windows for Workgroups make it likely that Windows 95 will work its way into the company's network, he said.

Win95 and NT make for a good fit. They both support 32-bit applications and long file names, and the components of Windows NT's BackOffice application suite, such as Systems Management Server (SMS) and Microsoft Exchange, are closely integrated with Windows 95.

Eric Lyngms, network manager for The Boeing Co.'s Defense and Space Group in Kent, Wash., who attended last week's Windows 95 launch, said his company "is testing everything." His facility maintains 1,800 NetWare 3.X nodes at several sites, but instead of moving to NetWare 4.X, his company may move to Windows NT Server — the Windows NT-based BackOffice suite of applications — and eventually, to Windows 95.

SMS in particular is enticing to Lyngms, especially if his department chooses to use Windows 95 on all its desktops. "SMS makes it much easier to administer the desktops on the network," he said. "If we had to drive all over Puget Sound to upgrade every desktop on site [to Windows 95], it would take forever" and be disruptive to end users, he said.

Administrative controls over the desktop are also of interest to Greg Gilkeson, the solutions center supervisor for Group Health Cooperative, Inc. in Renton, Wash. "We're looking at Windows 95 along with Windows NT," Gilkeson said. The health care provider has nearly 9,000 NetWare nodes across the Pacific Northwest but may switch to Microsoft's offerings to take advantage of the BackOffice applications, especially the Exchange messaging tools.

Microsoft Chief Executive Officer Bill Gates has emphasized Windows 95's network readiness, and in his launch demo, he showed how net managers can restrict user access to files or functions. More than half of the Windows update's new features relate to communications.

Collins Hemingway, Microsoft director of industry marketing for business systems, said, "If Windows 95 gets people moved over to 32-bit applications, then it will have accomplished much of its purpose."

Widespread customer movement to 32-bit programs paves the way for 32-bit NT and Win95 to merge into Cairo, Microsoft's promised object-based operating system. ■

IBM offers APPN/ATM specification

By Michael Cooney
Raleigh, N.C.

IBM last week submitted a document to the APPN Implementers Workshop (AIW) that defines a way for SNA users to easily migrate existing applications to Asynchronous Transfer Mode networks.

The APPN/ATM Interworking specification document describes how IBM will map its High Performance Routing (HPR) class-of-service routing directly to ATM's Quality of Service specifications.

The specification could be put into code for implementation in routers, hubs and other devices, supporting HPR as early as mid-1996.

The technology would enable Advanced Peer-to-Peer Networking/HPR users to utilize APPN's class of service — which defines route security, transmission priority and bandwidth between session partners — across an ATM net. It also means that users can migrate to ATM services simply by installing ATM adapters on their access devices, which may be routers, workstations, hubs or other communications devices.

HPR is an extension to IBM's APPN peer networking technology that adds a number of improvements, including congestion control and the ability to wrap around failures. The AIW is a group of vendors, including IBM, Cisco Systems, Inc. and 3Com Corp., that oversees APPN development.

"With APPN/ATM Interworking, users will be able to deploy the same SNA class-of-service routines across an ATM net with no changes to their existing applications," said Chuck Brotman, chairman of the AIW and an IBM senior engineer. "What we're doing is allowing the extension of HPR so it can utilize and request the different kinds of ATM services available."

Don McGliney, APPN product manager with Bay Networks, Inc., said the benefits go even further, giving APPN users the ability to employ the same session establishment and directory service feature they already use. Bay Networks will support HPR on its routers by year-end and could implement the APPN/ATM Interworking specification by mid-1996, he said.

Dave Bryant, director of SNA technology at 3Com, called the specification "a timely delivery of one of the key technologies SNA users will need going forward." 3Com will deliver HPR early next year and expects to implement the new APPN/ATM specification late next year.

One caveat about the APPN/ATM Interworking proposal is that, to be successful, it requires HPR to be widely deployed in SNA/APPN nets. Many analysts think HPR's late arrival to the internetworking game will hurt its widespread deployment and relegate it to niche market status — especially in the face of TCP/IP's continued rise to backbone prominence.

Steve Joyce, vice president of marketing for Ganymede Software, Inc., an SNA/APPN software development company in Research Triangle Park, N.C., noted that enhancements found in the next release of TCP/IP will address some of the class-of-service holes in its operation. But so far, there has been no rush to embrace the next generation of IP — IPNG — by the router vendors.

Others said the ATM Forum is working on a standard way of supporting multiprotocol with

See **APPN/ATM,** *page 83*

Microsoft launches Win95 amidst games and big names

By Peggy Watt
Redmond, Wash.

Microsoft Corp.'s marketing machine last week had the world worked into a frenzy over Windows 95, with otherwise sensible people lining up at computer stores late into the night for a chance to be part of it all.

The event was literally a carnival: Microsoft erected a Ferris wheel, tents containing third-party demos and a midway of gamFes on its main campus here. The show was beamed by satellite to dozens of other party sites around the globe and was emceed by Tonight Show host Jay Leno.

"You know, the problem with Windows 95 is that Microsoft hasn't publicized this product enough," Leno deadpanned at the close of his program, after an hour and a half of jokes and demos amid cheers from some 2,500 testers and guests at the main site alone.

In fact, Microsoft's advertising vehicles ranged from the Empire State Building (bearing Windows 95 colors) to *The Times* of London, which published a Microsoft-sponsored edition.

Microsoft's carnival games had a techno-twist, such as virtual golf and basketball, and a "DOS Toss" in which contestants threw DOS 6.2 disks through windows in a cardboard cutout.

Winners got off-the-wall prizes including a Microsoft Office 95 pillowcase, "So you can live, eat and sleep Microsoft Office, just like Bill Gates!" according to the barker.

"I can't believe the amount of hoopla," said Curtis Olliff, network coordinator with Alameda Ambulatory Care Services located in Oakland, Calif., who attended a satellite party at Great America amusement park in Santa Clara, Calif. "The anticipation is over, but now those support lines will start ringing."

As a marketing event, the Windows 95 launch was reminiscent of Apple Computer, Inc.'s Macintosh introduction 11 years ago, which occurred with then-unprecedented TV ads and a pep rally atmosphere. Apple piped up last week, too, reminding consumers that many features of the Windows 95 user interface have been available on the Macintosh for years. Apple placed ads and distributed T-shirts that declare, "Been there, done that." Apple also bought a billboard bearing the message "C:\ONGRTLNS.W95" within sight of Microsoft's launch.

The party really kicked off at midnight, when many retailers started selling the long-overdue Windows 95. Microsoft executives Steve Ballmer and Jeff Raikes hit the interstate with Jay Amato, Vanstar Corp. president, the stereo in Raikes' BMW blasting the Stones' song "Start Me Up," which was the launch theme (and marked the first time the musicians have licensed their work commercially). The trio visited seven stores where hundreds of customers lined up to make early-morning purchases.

"If 10 years ago you'd said that people would line up at midnight to buy an operating system upgrade, I wouldn't have believed it," said Raikes, Microsoft senior vice president.

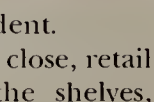
At the program's close, retail Win95 boxes hit the shelves, guests hit the carnival midway and Leno hit the gas in a golf cart shaped like a Microsoft mouse, bearing the state of Washington vehicle license plate LAUNCH95. ■

OK, OK, WE'LL TAKE IT

Holdout IBM finally licensed Windows 95 from Microsoft — on the eve of last week's launch. The agreement could enable IBM to implement Windows 95 code in OS/2 Warp, ensuring the application compatibility that IBM was previously unable to deliver.

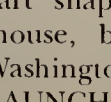
Wacky WinFacts

Lesser known highlights of the Windows 95 launch:



Hawaiian Airlines ads coax Seattleites to travel where they "won't have to hear about Windows 95."

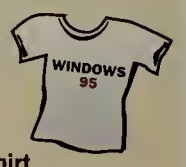
Across the international date line, a **New Zealand retailer** heralds its sale of the first legal copy of Windows 95 before the actual launch.



Windows 95's development team estimates it consumed **2.2 million cups of coffee** during the software's development. The team also reported the **birth of 63 babies** to team members during that same time.

Microsoft presents a Windows 95 infomercial this week in most major markets — preempting *Jeopardy* — featuring **Bill Gates in a Coca-Cola commercial.** The aforementioned commercial has Gates at a Coke machine at Microsoft headquarters, where soft drinks are free.

The launch was also broadcast on Microsoft's Web site, where participants could comment and sign up for a **free T-shirt (http://www.microsoft.com).**



GRAPHIC BY SUSAN SLATER



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Start

Internetworking

Cisco upgrades router software and hardware

By Jim Duffy
San Jose, Calif.
While users are considering migrating their LAN internets to switched infrastructures, Cisco Systems, Inc. last week announced software and hardware enhancements to its routers to secure their place in enterprise networks.

On the software side, Cisco unveiled extensions to its Internetwork Operating System (IOS) that allow users to customize routing, optimize WAN links and enhance security. On the hardware side, Cisco rolled out the high-end 7500 line, which is aimed at Bay Networks, Inc.'s Backbone Concentrator Node and features increased performance and port density over the company's previous top-of-the-line devices (*NW* Jan. 9, page 1).

Version 11.0 of Cisco's IOS routing software now features policy-based routing, which enables users to establish parameters for directing traffic flows out particular interfaces. For example, users might want to restrict File Transfer Protocol data to ISDN lines and telnet data to X.25 circuits so that data only goes to certain sites or is transmitted using a particular carrier service.

The new feature also will let users set bits in an IP packet with policy-based routing to implement class-of-service requirements, enabling the packet to bypass the router's queues and head directly to the port.

Cisco may be unique in offering policy-based routing, analysts said.

"You can route sensitive flows over internal leased lines and use the most cost-effective network technology for the level of urgency or security you have," said John Coons, director and principal analyst for wide-area networking at Dataquest, Inc. in

See **Cisco,** *page 82*

ROUTER ROUNDUP

Model	Chassis slots	Max number of route/switch processors	Backplane speed (G bit/sec)	Pricing
7505	5	1	1.0	$10,900
7507	7	2	2.1	$19,900
7513	13	2	2.1	$28,900

Software costs an additional $4,000 to $8,000 per router. Versatile Interface Processors cost an additional $12,000 to $17,000 each and will be available in the fourth quarter of 1995 and the first quarter of 1996.

IBM bulking up MQSeries middleware

By Michael Cooney
Orlando
IBM officials last week said the company is enhancing its MQSeries middleware to make it easier for users to build client/server applications and link them to legacy data.

IBM will incorporate its object-oriented technology into MQSeries so users can give object-based applications asynchronous communications capabilities. The middleware also will be extended to include direct links to legacy TSO, IMS and CICS packages, as well as ties to wireless communications products.

MQSeries is a messaging and queuing technology that simplifies the building of application-to-application communications links over any network protocol. MQSeries lets applications communicate asynchronously, which means that transactions or messages will wait in queues until remote applications are ready to receive them.

"We want to enable MQSeries to participate in the widest possible array of enterprise environments," said Steve Craggs, manager of IBM's MQSeries business in Hursley, England.

IBM will make MQSeries more attractive in object-oriented application environments by injecting its System Object Model (SOM) and Distributed SOM technology into the middleware. This will let users build object-based applications, which rely on synchronous communications by nature, and give them asynchronous communications capabilities, according to Stuart Jones, IBM's manager of MQSeries technical strategy.

To help users incorporate data from legacy applications into new client/server-based ones, IBM is working on programs to link MQSeries to its chief transaction processing systems — CICS, IMS and TSO. The bridge programs would let MQSeries messages dive into a CICS application and grab data needed by a client/server application.

IBM is building the same bridge support into its DB2 platform so users can more easily store and retrieve MQSeries messages in distributed databases, Craggs said. In addition, IBM is looking to make MQSeries work with other transaction processing packages such as Novell, Inc.'s Tuxedo monitor.

IBM released few details about how it is linking MQSeries into wireless environments, but Craggs said IBM is working on a product that would enable users to deploy wireless MQSeries-based applications.

"MQ is ideal for applications where there are long periods of disconnected activity or periods where service is interrupted or intermittent," Craggs said.

Analysts said the MQSeries enhancements are needed to keep the technology viable and visible.

"IBM has had limited success with MQSeries, so it is wise to take advantage of the technology and incorporate it with SOM/DSOM and CICS products to make it a stronger offering," said Wayne Eckerson, a senior consultant with the Patricia Seybold Group, Inc. in Boston. "MQSeries could be most important for users deploying objects because [object request brokers] need a robust transport system."■

I WANT MY MOMA

IBM, along with the 21 other vendor and user companies that make up the Message Oriented Middleware Association (MOMA), will discuss middleware's role in future enterprise client/server environments at the upcoming NetWorld+Interop show in Atlanta. For more information, access http://www.sbexpos.com via the Web.

Cable & Wireless manages global private lines, muxes

By David Rohde
Vienna, Va.
Cable & Wireless, Inc. last week announced a service through which it will obtain for U.S. companies dedicated circuits among as many as 10 countries and install and manage customer multiplexers in each country.

Cable & Wireless' new Global Managed Private Line service resembles recent offerings by major U.S. carriers that provide international private lines over so-called overlay networks composed of carrier-owned facilities and circuits leased from foreign carriers.

Overlay networks enable domestic carriers to provision private lines between foreign countries for U.S. firms instead of forcing customers to turn to foreign carriers. The service can then be billed in dollars on an invoice combining these users' purely international leased circuits with those originating in the U.S.

In Cable & Wireless' case, the carrier also automatically installs a Newbridge Networks, Inc. time-division multiplexer at each terminating

See **Global,** *page 84*

HAVE PRIVATE LINES, WILL TRAVEL

Cable & Wireless' Global Managed Private Line service is available in the following countries:

- Denmark
- France
- Germany
- Hong Kong
- Italy
- Japan
- Spain
- Sweden
- U.K.
- U.S.

Motorola pumps voice over public, private frame relay

By Jim Duffy
Mansfield, Mass.
Motorola, Inc. last week brought out software for its remote access devices that melds LAN, terminal-to-host and voice traffic over public and private frame relay circuits.

At the same time, the company announced a new router for large branch offices and regional concentrator sites. The software, called VoiceRelay, runs on the firm's 6520 and new 6560 routers. It allows simultaneous transmission of voice and data over a shared frame relay link at 19.2K bit/sec to T-1/E-1 speeds.

Though designed to reduce WAN expenses, analysts said cost savings with VoiceRelay are relative.

"If you're a real small company running voice over frame relay, you get your [plain old telephone service] line pretty cheap, so it's no big deal," said Maribel Lopez-Howard, research analyst for data communications at International Data Corp. in Framingham, Mass. "If you're a medium-sized company [or one with more than 100 sites], this might work," she said. VoiceRelay's drawback, she said, is that it is proprietary: It won't work with non-Motorola gear, such as the Cisco Systems, Inc. routers that pervade the market.

VoiceRelay is available now, and pricing begins at $750 per port.

Motorola's new 6560 router is a network access and concentrator platform for connecting 20 or more remote branch offices to corporate or backbone networks. It supports frame relay and X.25 leased lines, and digital data service, ISDN and Nx64 switched services.

The base price of the 6560, which will be available within 30 days, is $5,995.

©Motorola: (508) 261-1058.

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Start™

Network General unveils Unix-based LAN analyzer

By Jim Duffy
Menlo Park, Calif.

Network General Corp. this week will unveil a Unix-based management console and a Remote Monitoring (RMON)-compliant probe capable of supporting as many as four LAN segments.

Foundation Manager for Unix is an upgrade of a Windows-based application suite for LAN analysis. It runs on SunOS-, HP-UX-, AIX- and Solaris-based workstations, serving as a centralized console for continuous data collection and, when it is used with Network General's Reporter application, automated reporting.

Foundation Manager for Unix also includes a feature called QuikStats, which depicts segment conditions using dials, graphs and charts, as well as Baseline for setting thresholds that trigger alarms when crossed.

"It's a pretty significant change" from previous Network General offerings, said Marc Snyder, network manager for the polymers division at Ciba, a pharmaceutical firm in Brewster, N.Y.

"We like to do real-time, 24x7 data logging and monitoring, and don't find that the PC running Windows is the best environment to do that in. It's much more reliable and much more robust to do on a Unix machine."

Probe reduction

The new RMON probe consists of Foundation Probe hardware and Foundation Agent software, which together reduce the number of probes users need to manage multiple LAN segments.

Foundation Probe consists of an Intel Corp. Pentium-based PC running Windows, multiple network adapter cards and Foundation Agent software for collecting LAN statistics. As many as four Ethernets or up to three token rings can be monitored from a single Foundation Probe. Previously, users had to deploy a hardware probe on every LAN segment to be monitored.

"We've got 16 Ethernet segments in this building," Snyder said. "We own quite a number of Network General probes."

Foundation Probe also comes in a single port version that can later be upgraded to support multiple ports. Users can build their own Foundation Probe by running Foundation Agent software on Network General-approved PCs and adapter cards.

Foundation Manager for Unix ranges in price from $5,995 to $7,990. It is available now for SunOS and HP-UX systems, and will be available in 90 days for AIX and Solaris machines.

Foundation Probe is priced at $5,995 for a four-port Ethernet version and $6,495 for a three-port token-ring configuration. It will be available in 90 days. Foundation Agent, which is available now, costs $2,395.

✆Network General: (800) 764-3337.

A foundation for management

Features of Network General's Foundation line:

- Continuous history collection
- Automated reporting on network activity
- Visual scanning of segment conditions
- Monitoring of up to four Ethernets and three token rings from one PC
- Remote configuration of manager console and probes from a central Unix workstation

Software AG to roll out database for Unix and NT

By Barb Cole
Reston, Va.

Software AG of North America, Inc. will announce this week a low-cost database for Windows NT and Unix that has built-in data replication and management tools.

Adabas D is designed for distributed environments, yet is easy to set up and administer, according to Mike Schiff, director of data management at Software AG. It includes a global data catalog that helps users access information stored on any distributed servers.

RealityCheck

Product
Adabas D

Company
Software AG

The benefits
- ▲ Data replication is included.
- ▲ Has built-in graphical tools for centrally managing distributed databases.
- ▲ Low cost.

The drawbacks
- ▼ Support for parallel processing computers is limited to parallel backups.
- ▼ Few front-end tool or client/server application providers support it.

The user view

"Adabas D has been totally transparent to our operation, which I like a lot. It's also tightly integrated with our financial application, SAP R/3."

Rocky Haddix, controller and chief financial officer, Emco-Maier

And at $17,500 for a 100-user Windows NT or Unix license, Adabas D is priced at about a quarter of the cost of similar offerings from Oracle Corp. and Sybase, Inc., Schiff said.

"There have been earlier versions of Adabas for the client/server market that were basically ports of our mainframe software," he said. "That only appealed to our existing mainframe users, so we went back and designed Adabas D."

The database includes built-in update-anywhere replication, in which any user may make changes to the data, and snapshot replication, in which a master database is updated by multiple users. Also included is a Windows-based graphical tool that lets administrators perform basic administrative tasks on a crop of distributed databases from a central point. But Replication sessions cannot be managed using the tool, Schiff said.

In addition to supporting the SQL-92 standard, Adabas D can be run in either Oracle- or IBM DB2-compatibility mode, which enables users to take advantage of those vendors' SQL language extensions and move applications built for either database to Adabas D unchanged.

It runs on symmetric multiprocessing computers with as many as 13 processors, but the only database operation it can perform in parallel is a backup.

Even though Adabas D has similar functionality to databases from competitors such as Oracle and Sybase, analysts said Software AG faces an uphill battle.

"Most of the people who are making database decisions now are more likely to go with a market-leading database," said Sandy Laufer, research director at Gartner Group, Inc. in Stamford, Conn. "[Software AG's] best hope is to find a geographical sector or vertical market and focus on that."

Adabas D is available now.

✆Software AG: (703) 391-5050.

SBC makes move to enter Internet access business

By David Rohde and Tim Greene
Washington, D.C.

Regional Bell operating company SBC Communications, Inc. is poised to become the third RBOC to enter the Internet access business and the first to offer such a service over dial-up analog phone lines.

SBC, which serves a five-state Southwestern region, earlier this month filed an Internet access plan with the Federal Communications Commission and is hoping for approval by November.

Meanwhile, Pacific Bell is slated to make available next week a previously announced Internet access service, but only through its T-1 and fast-packet services, such as frame relay and Switched Multimegabit Data Service. Ameritech Corp. is currently offering an Internet access offering over frame relay and its SMDS equivalent, which is called Connectionless Broadband Data Service.

"The RBOCs have to win [Internet] customer loyalty very soon and not let all this business run past them," said Robert Rosenberg, president of Insight Research Corp., a consulting firm in Livingston, N.J.

The RBOCs are subject to a key limitation in that they are forbidden to carry Internet traffic beyond the boundaries of a local access and transport area, but they are not letting it stop them.

SBC noted in its FCC filing that for now, subscribers to its service will have to choose an interexchange provider as part of its offering. But Rosenberg considers the filing a "hot standby" to give the RBOC legal clearance in case LATA restrictions are lifted under new federal legislation.

Your phone company and the 'Net

RBOCs' Internet access services and access methods:

Ameritech	Offers Internet access over frame relay and SMDS.
Bell Atlantic	No service available; has long-term plans.
BellSouth	Working on "novel approaches to the Internet."
NYNEX	Developing a service.
Pacific Bell	Introducing service this week over frame relay, SMDS, T-1.
SBC Communications	Service ready to go over analog phone lines and ISDN BRI, pending FCC approval; planned later for T-1, frame relay, ATM.
US WEST	Considering a service.

"They want to have some documentation on file when they are granted the ability to go outside the LATA," he said.

In the meantime, RBOCs can offer a variety of service support features typically requested of Internet access providers. For example, Ameritech provides a router, data service unit/channel service unit, router and network monitoring, and advice about security. Prices range from $300 to $2,400 per month, depending on service, bandwidth and state.

SBC officials would not provide additional details about vendor partnerships, but the RBOC's FCC filing said it will provide browsing software and help desk services. Service will initially be offered in the metropolitan areas of Kansas City, St. Louis, Houston and Austin, Texas.

Pacific Bell has agreements to provide Cisco Systems, Inc. routers and Sun Microsystems Computer Corp. servers to enable Internet access, along with Netscape Communications Corp. Netscape Navigator software.

Sun also provides firewall security.

The initial offering will be available in San Francisco, Los Angeles, San Diego and Sacramento, Calif., and will be deployed in other parts of the state in 1996.

Installation for a 56K bit/sec frame relay connection costs $1,250, plus a onetime charge of $750. Thereafter, the Internet access fee is $400 per month.

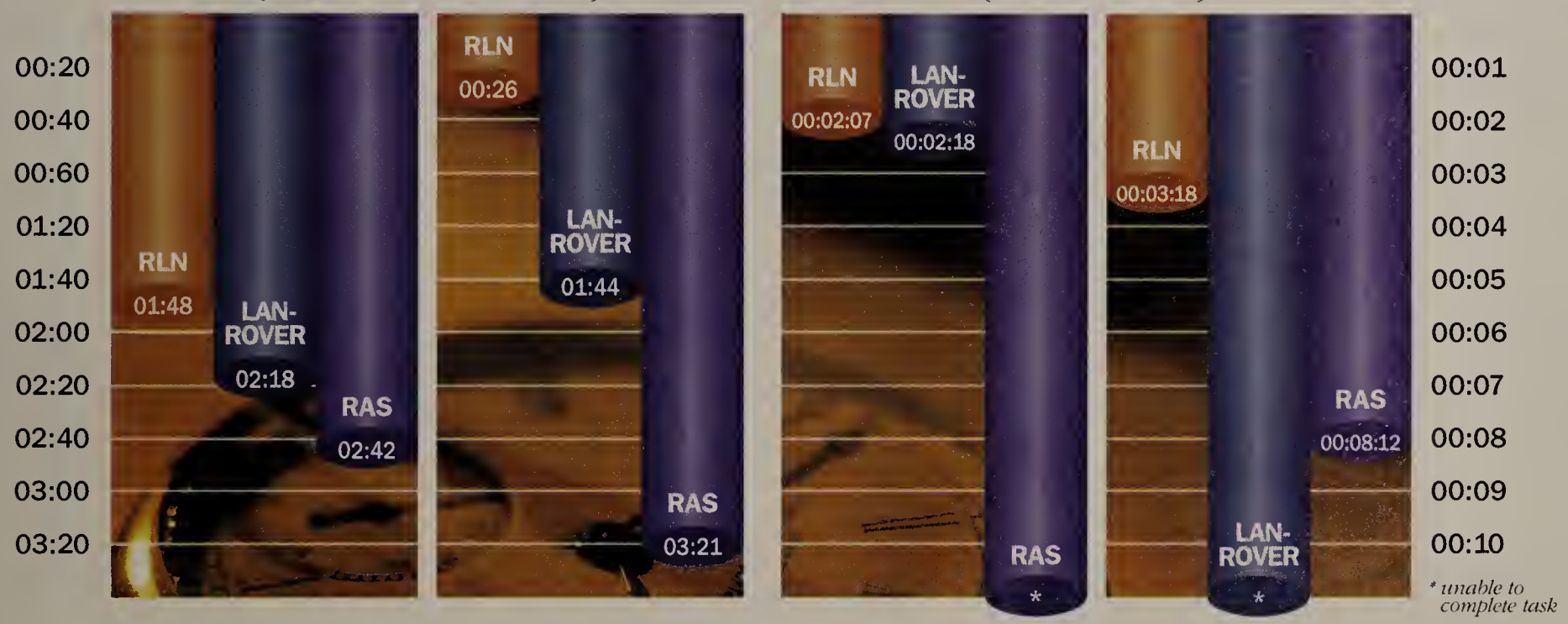
SMDS service at 16M bit/sec costs $3,500 for the access installation, plus a onetime charge of $3,000. The monthly fee for Internet access thereafter is $2,000.■

COMMENTS?

See "How to reach us" on the Opinions pages.

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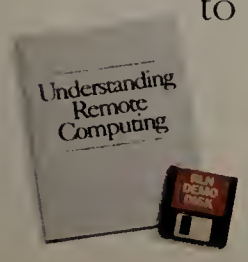
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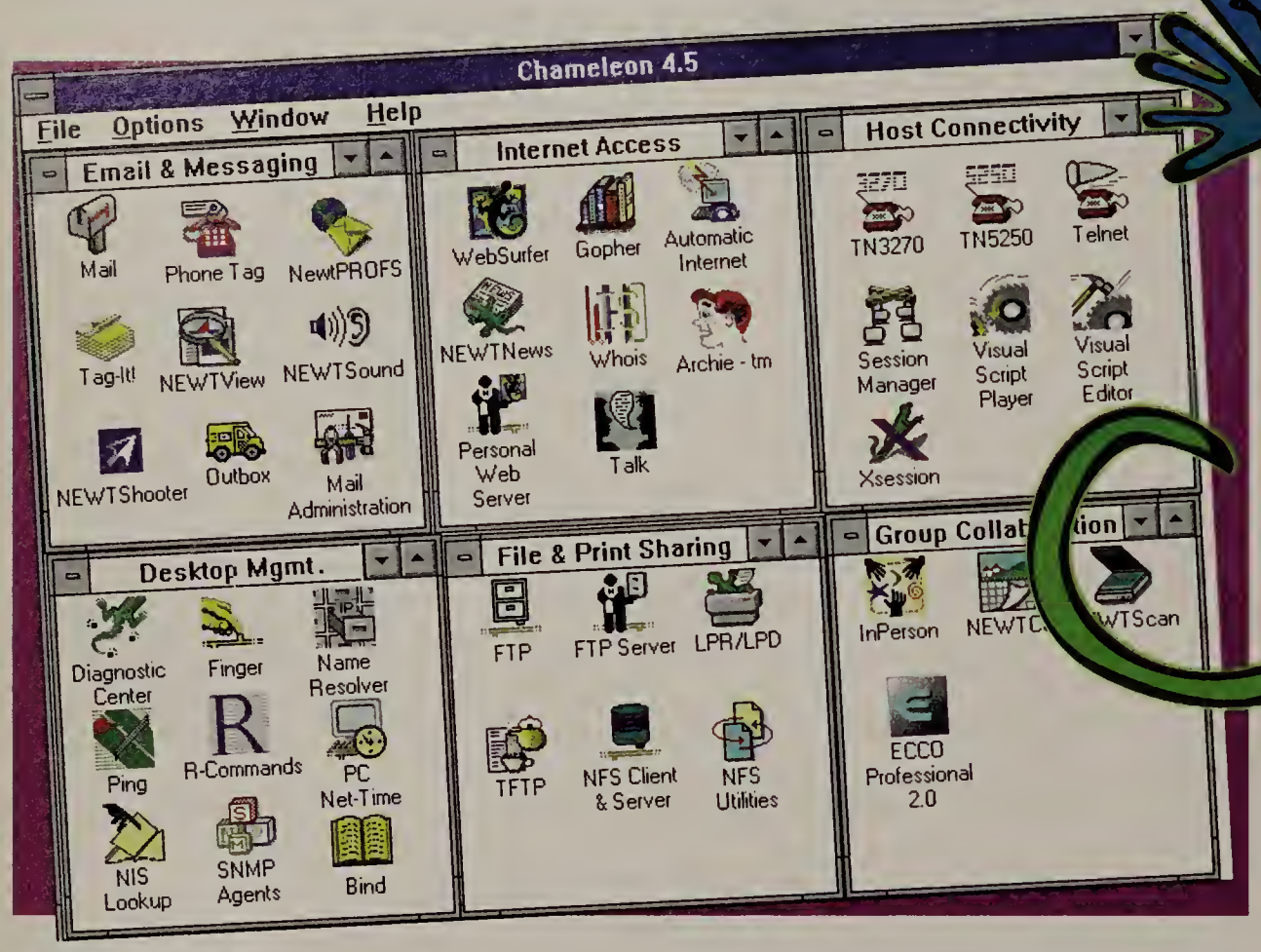
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Briefs

■ **Cabletron Systems, Inc.** *is looking at licensing Seagate Enterprise Management Software's NerveCenter event correlation technology to enhance the* **alarm filtering capabilities** *of its Spectrum platform.*

Cabletron is currently evaluating NerveCenter to determine whether it can complement Spectrum's own alarm suppression capabilities, said Patricia Chrystycz, director of systems and network management marketing for Cabletron. The company may have something more to say about NerveCenter integration in about six to eight weeks, said Bill Tracy, engineering director for Spectrum applications at Cabletron.

Cabletron would be the third major management platform vendor to license the Seagate technology. The other two are Hewlett-Packard Co. and SunSoft, Inc.

■ *As expected,* **Northern Telecom, Inc.** *has become the first manufacturer to win authorization from the Federal Communications Commission to operate a* **wireless telephone system** *in the unlicensed portion of the personal communications services (PCS) spectrum. NorTel now can begin U.S. marketing of the Companion Wireless Communications System, a PCS adjunct to NorTel's Meridian private branch exchange that provides access to all employees within a building or campus without racking up cellular airtime charges (NW, July 3, page 6).*

■ *The permissive dialing period for* **western Washington's new 360 area code** *ended last week, meaning that private branch exchanges that have not been reprogrammed for new-style area codes cannot reach certain parts of the state. The permissive dialing period had been extended past its original May expiration following user protests (NW, May 15, page 6). US WEST, Inc. is offering users a toll-free test number: (360) 532-0023.*

Vendors look to expand APPN

IBM and others propose extensions to APPN and Data Link Switching technology.

By Michael Cooney
Raleigh, N.C.

IBM, 3Com Corp. and others last week announced they were working on extensions to APPN and Data Link Switching (DLSw) that promise to make those technologies more open and easier to deploy.

At the APPN Implementors Workshop (AIW) here, IBM proposed opening some previously closed technology — such as Border Node — to multivendor Advanced Peer-to-Peer Networking product developers. And 3Com proposed extensions to the DLSw standard to enable it to support APPN, AppleTalk and other protocols. Today, DLSw lets Systems Network Architecture and NETBIOS traffic flow over TCP/IP backbones.

AIW participants, including Cisco Systems, Inc. and Bay Networks, Inc., are defining the multivendor development of APPN and other technologies such as DLSw.

IBM used the event to hand out the specifications for its Border Node technology. Border Node, which is already supported in IBM's mainframe and Application System/400 products, lets users interconnect APPN nets to build larger ones.

Vendors such as Cisco Systems and 3Com have been urging IBM to release the specification so they can build support for it into their APPN products.

AIW vendors have been complaining that the Border Node specification is not included in the Network Node (NN) licenses most companies have paid for. Until recently, IBM hinted there may be additional charges for the Border Node specification. But IBM is now opening up the specification at no cost to any vendor interested.

IBM is also offering another extension to APPN, known as the distributed discovery feature, which automatically registers devices on a Token-Ring LAN to the APPN directory found in APPN NNs. These nodes are the brains of APPN nets in that they control routing and directory functions.

On the AIW menu

IBM and others want to:

- Open APPN's Border Node specification
- Distribute APPN Discovery feature
- Expand APPN directory services to recognize applications
- Extend DLSw to include new protocols, such as APPN and AppleTalk

Other vendors also proposed extending the APPN directory services to include the registration of applications. Wall Data, Inc. and Insession proposed using the APPN directory services to automatically register specific applications and their locations so users could locate and access resources across an APPN net. Currently, the APPN directory registers only network hardware devices.

On the DLSw front, 3Com discussed extensions to the specification that would make it easier to interconnect large multivendor DLSw-based nets and accommodate underlying transport protocols such as Novell, Inc.'s IPX.

Philippe Byrnes, a product director with 3Com said DLSw should be extended to support most desktop protocols, such as AppleTalk, and other wide-area data transport protocols, such as APPN. The benefits would be much the same as they are in the current DLSw implementation. For example, broadcast-intensive LAN traffic would be kept off the backbone by a DLSw-based router.

DLSw, however is not the cure-all some vendors would like it to be, noted Lynn Nye, president of NetResults, a consultancy in Portland, Ore.

"RFC 1490-compliant frame relay can handle multiprotocol traffic much more efficiently and without all of the overhead of DLSw," Nye said. ■

AT&T readies SNA service, touts frame relay platform

By Joanie Wexler

Now that users have accepted frame relay for carrying LAN traffic across the wide area, AT&T and its rivals are prepping new equipment packaging options to woo Systems Network Architecture shops to the fast-packet technology.

AT&T is expected to launch an SNA-over-frame relay managed network service this fall and in preparation is trying to convince customers that its StrataCom, Inc. IPX switch is better for carrying SNA than are competing platforms — a claim leaving many scratching their heads.

AT&T's new AccuWAN managed network service will bundle its InterSpan frame relay service with SNA-oriented frame relay assembler/disassembler (FRAD) devices made by Motorola, Inc., Netlink, Inc., Sync Research and possibly IBM, according to sources familiar with the carrier's plans.

Switch characteristics

AT&T touts the strengths of its IPX switch for carrying SNA over frame relay, but other platforms have similar characteristics.

Switch (carriers using switch)	Cell transport/ overhead	Per-PVC buffering option	Congestion management
IPX (AT&T, LDDS WorldCom)	24-byte/16%	Yes	Throttle back
BNX (MCI)	Optional, 53-byte (ATM)	No	Discard above CIR
TPX 1100 (Sprint)	132-byte/6%	Yes	Discard above CIR
Cascade 9000 (LDDS WorldCom)	Optional, customizable cell size	No	Discard above CIR

MCI Communications Corp. acknowledged that it, too, plans to launch an SNA-over-frame relay managed net service later this year.

Since SNA depends on predictable throughput to accommodate the requirement for packet acknowledgment, AT&T

See **SNA**, *page 24*

Voice/data integrated in ATM service

By Tim Greene
Omaha, Neb.

MFS Datanet, Inc. last week announced one of the first wide-area ATM services designed to carry both voice and data.

The new service, Wide Area Voice Exchange (WAVE), is available in Chicago, New York, Los Angeles, San Francisco and San Jose, Calif., at speeds ranging from 56K to 155M bit/sec.

It will be available in 37 other U.S. cities and 25 foreign cities by the end of next year, according to Douglas Hickey, senior vice president of sales and marketing at MFS. The rollout schedule will be determined by user demand, he said.

MFS played up the fact that it offers the service end-to-end, avoiding the need for customers to contact two or three carriers for a link that starts in the territory of one regional Bell operating company and lands in the territory of another.

MFS provides whatever hardware is necessary to interface with customer premises T-1 or Ethernet ports.

MFS offered no pricing plan other than that it would be dependent on bandwidth use and network configuration. An MFS hypothetical three-city network using separate services for voice, video and data traffic has the user saving 20% to 25% (see graphic, page 24).

While analysts said it was the first such Asynchronous Transfer Mode offering, the fact that the user doesn't really need to know that it is an ATM service is part of its attraction.

Walter Miao, an analyst with International Data Corp./LINK, said users' main concerns would be pricing and ease of ordering and managing the service, so the

See **ATM**, **page 24**


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Cabletron extends systems mgmt.

Unveils its own third-party applications for enhanced enterprise management.

By Jim Duffy
Waltham, Mass.

Cabletron Systems, Inc. last week unveiled a raft of new systems management applications in an effort to propel its Spectrum platform beyond network device management and into the realm of enterprise client/server control.

Key among the new offerings is an application from Calypso Software Systems, Inc., a Cabletron software development partner, that performs policy-based management of desktop workstations, servers and applications. The application, called Atrium EMS for Spectrum, represents the next generation of the companies' MaestroVision workstation configuration management package for Spectrum.

"Anything that increases the ability to do policy-based management is welcome" because it automates many of the repetitive tasks in systems management, said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo.

Other new applications include a program from Seagate Enterprise Management Software for managing NetWare and Windows NT systems, and an application from BGS Systems, Inc. for managing application performance. Not to be outdone, Cabletron also brought out its own packages for workstation and database management.

Filling out Spectrum

Together with other third-party packages that had been expected (*NW*, Aug. 21, page 1), these products help fill out the Spectrum systems management portfolio, which in turn enhances the enterprise control capability of the platform (see graphic).

"If you're going to manage the whole enterprise, you have to think about systems management," said Tim Wilson, senior consultant at Decisis, Inc. in Herndon, Va. That has clearly been missing from the Cabletron portfolio, he said.

Calypso's Atrium EMS for Spectrum runs on Unix, Windows NT, Windows 95 and NetWare clients and servers. It is tightly integrated with Spectrum's knowledge base, meaning that data on systems and applications managed by the product can be imported into Spectrum's object-oriented modeling engine and correlated with data from other managed devices.

This allows users to see the relationships between systems, applications, databases and network devices.

FULL SPECTRUM SYSTEMS MANAGEMENT COVERAGE

	CA-UniCenter	Calypso Atrium	Tivoli Enterprise Console	Gradient iFOR/LS	CompuWare	Software Professionals	Metrix WinWatch	OpenVision Event Manager	Empire	BGS Best/1	ICS SAP R/3	Syllogic Printer Management	Seagate LANAlert	Spectrum BlueVision	Spectrum Applications
System resources	✔	✔	✔			✔	✔	✔	✔	✔			✔	✔	✔
User administration	✔	✔	✔			✔			✔						✔
Application management	✔	✔	✔			✔	✔	✔	✔	✔	✔		✔		
Print management	✔	✔	✔			✔	✔	✔				✔			✔
Performance management	✔	✔		✔	✔	✔		✔	✔	✔			✔		✔
Database management	✔	✔			✔	✔		✔		✔					✔
Software distribution	✔	✔	✔				✔	✔							
License management				✔											
Scheduling	✔	✔	✔	✔	✔	✔		✔		✔					✔
Storage management	✔		✔		✔	✔		✔							
SNA resource management										✔				✔	
SNA alert management														✔	

Atrium EMS for Spectrum includes intelligent agents for automating systems management functions, such as software distribution. The agents act as daemons that can operate autonomously and execute tasks automatically on behalf of a business process or application, based on policies established by the user.

Atrium EMS for Spectrum also includes a C-language tool kit that lets users customize their own manageable objects.

Seagate's LANAlert application, meanwhile, provides distributed domain management of NetWare and NT servers. LANAlert passes alarm and event information from these systems to Spectrum consoles.

BGS' Best/1 software promises to provide enterprisewide performance and capacity measurement, analysis and reporting for Spectrum users. But the level of integration with the Spectrum platform — menu-bar, alarm and event, or knowledge base — has yet to be determined, according to Cabletron.

The Cabletron products for workstation hardware management are called Spectrum Workstation Management Modules. They collect data on system resources and performance, as well as user administration from Unix workstations, including Hewlett-Packard Co.'s HP-UX hardware, and import it into Spectrum's knowledge base. The modules work with agent software from Empire Technologies, Inc.

Lastly, the Spectrum Oracle Management Module enables Spectrum users to model and manage Oracle7 databases. It uses Oracle's database Management Information Base (MIB) and the Internet Engineering Task Force's database MIB.

The Oracle module can gather data on such topics as system resource, user administration and scheduling.

All applications will be available by the end of the first quarter of 1996. ■

Sprint develops call announcement feature

By David Rohde
Kansas City, Mo.

Carriers are looking to emulate the newly popular CPE-based call screening feature that prompts telephone callers for their names, but they may not be able to integrate it with electronic and fax mail systems as easily as equipment vendors can.

For example, Sprint Corp. is working on an Advanced Intelligent Network (AIN) application under the working title of Audible Calling Name, confirmed Steve Carter, director of product development for the carrier.

Subscribing customers would instruct Sprint to prompt calling parties for their name. At that point, the party has a variety of options, including taking the call or letting it go to voice mail.

"It's a fundamental need to know who it is on the other end of the line," Carter said.

Sprint's work uses emerging AIN platforms to emulate features of existing customer premises equipment, notably the ViewCall module on Active Voice Corp.'s TeLANophy LAN interface to its Repartee voice processing system.

With the TeLANophy platform, not only are callers prompted for their name, but the name also can be delivered over a multimedia sound device, with multiple options available on the spot to the calling party (see graphic). And voice messages can be integrated into a unified messaging system with E-mail messages and faxes. Since Active Voice offers speech-to-text conversion via a new E-mail reader feature, E-mail messages are accessible by phone.

Taking a peek at ViewCall

Active Voice's ViewCall module not only plays the caller's name at the user's workstation, but also lets the user perform the following tasks through point-and-click commands:

- Ask the caller to hold
- Play a custom greeting
- Transfer the caller to another extension
- Listen to the caller's message as it is being recorded
- Take the call after the message has begun
- Integrate voice messages into a list of E-mail and fax messages

"You can have a running conversation with someone when they're in E-mail and you're in voice," said Bard Richmond, Active Voice president.

But like other carrier net-based services, Sprint's Audible Calling Name could present an economic advantage to users simply looking for an effective call screening device, suggested Robert Rosenberg, president of Insight Research Corp., a consulting firm in Livingston, N.J. "I would ask whether I can do it as cheaply in a CPE environment as it can be offered by someone like Sprint," Rosenberg said.

Ultimately, carriers may be able to extend such services using the potential of AIN to integrate with other messaging and transaction platforms, Rosenberg said, though AIN applications have been notoriously slow to roll out. Services such as Audible Calling Name are "like using a half of one percent of the capabilities of the intelligent network," he said.

Both CPE and network-based call announcement methods address the perceived limitations of caller ID, which is generally still available only on local phone calls, though the Federal Communications Commission has mandated national caller ID by December.

"Caller ID is not a real good screening device, and call waiting doesn't identify the calling party," said Sprint's Carter.

Sprint's development work is now centered in its local telecommunications division rather than in its long-distance arm.

"The application is largely developed, and we'll be testing it in a market this year," Carter said. He noted that the carrier has an AIN service node in Las Vegas, where a Sprint subsidiary serves as the local telephone company. ■

BusinessBriefs

Williams Bros. Lumber Co. in Atlanta has implemented a wireless field sales application with the help of application developer **DataSolutions, Inc. (DSI)** and net service provider **RAM Mobile Data.** DSI's PerfectRep application and RAM's packet radio net will allow Williams Bros. sales representatives who meet with home builders about construction sites to place orders, run customer credit checks, get inventory updates and perform other host-based functions without the need for wires, the lumber company said last week.

StrataCom, Inc. has sold about $10 million worth of its BPX Asynchronous Transfer Mode switches and AXIS multiservice access units to long-distance carrier LDDS WorldCom. The equipment supports both frame relay and ATM services, enabling narrowband services of up to 2M bit/sec but also letting the carrier beef up its ATM infrastructure.

The Federal Communications Commission is cutting about 200 jobs, or nearly 10% of its workforce, during the next year. Half the agency's field offices also will be closed, FCC Chairman Reed Hundt said. The agency's move is in anticipation of an expected budget cut from Congress, where the House of Representatives has approved a fiscal year 1996 budget of $186 million, $39 million less than Hundt's request.

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Siemens Rolm enhances skill-based call routing

By David Rohde
Santa Clara, Calif.

Siemens Rolm Communications, Inc. last week gave network administrators a new tool to use in their ongoing quest to route 800 calls to the agent best equipped to handle an inquiry.

The private branch exchange vendor's ResumeRouting software is designed to match agents with customers based on more than 250 criteria, such as agents' knowledge and interest in each of the multiple products or services typically supported by an individual call center.

The software is loaded on a Pentium-class server connected through the vendor's proprietary CallBridge computer telephony link to a Siemens Rolm PBX with automatic call distribution capabilities. Only most recently introduced PBX models are supported (see graphic).

Using information about the caller's telephone number and the 800 number dialed — plus, where available, inputs from an interactive voice response system — the PBX determines the nature of the call and matches it against the agent profiles stored in the server.

Siemens Rolm officials compare this system to more rudimentary skills-based routing methods, which lump broad groups of agents into rigid skill sets based on their overall knowledge of product lines, languages or ability in dealing with certain classes of customers.

Reviewing ResumeRouting

ResumeRouting server-based application:

- Requires a 90-MHz Pentium-class server
- Is priced from $35,000 (100-agent site) to $55,000 (300-agent site)

Optional ResumeRouting client software:

- Requires an Intel 386-based system or higher running Windows
- Is priced at $500 per copy

ResumeRouting also requires a Siemens Rolm CBX 9751, Model 30 or 80 and Release 9006.2.

The ResumeRouting software, available immediately, has been trialed at a General Electric Co. financial services help desk and at University Bank in Palo Alto, Calif., said Max Fiszer, applications marketing director at Siemens Rolm.

Fiszer added that ResumeRouting is not for everybody. "We're not going to sell 1,000 ResumeRouters next year," Fiszer said. "A lot of companies are not ready for that."

Siemens Rolm is also offering ResumeRouting client software that enables call center representatives to interact with the call queue for special call handling.

For example, agents can select individual calls from the call queue so that customers with specialized needs can be identified for prompt service.

The entire system is based on detailed agent resumes in which each of as many as 250 skills can be assigned a proficiency and preference rating from 0 to 9.

For example, in a help desk application, an agent could be rated on a skill labeled "Lotus Notes" as having a proficiency of 5 (meaning he is fairly knowledgeable about Notes) and a preference of 8 (meaning he is very interested in Notes).

Or on a skill labeled "Spanish," he could have a proficiency of 7 (meaning the agent speaks Spanish well, though not perfectly) with a preference of 4 (suggesting he's willing but not thrilled to take calls in Spanish).

©Siemens Rolm: (408) 492-2000.

ATM

Continued from page 19

fact that the service is ATM makes little practical difference. "We, as users, don't care if its variable bit rate [VBR] or orange juice cans with strings attached. We want to make sure we get quality service."

Maio said MFS indicated its ATM prices would always be below what it would cost to buy separate lines for voice, data and video from MFS.

Christine Heckart, senior broadband specialist for TeleChoice, Inc., a consultancy in Verona, N.J., said that makes buying the service easier. "End users don't have to learn about ATM, don't have to be prepared to migrate to ATM; they don't have to know about ATM at all," she said.

WAVE SAVINGS

Estimated costs for MFS' integrated voice/data ATM service, WAVE, compared to a network of multiple services. Assumes a three-site network in New York, Chicago and Los Angeles.

- WAVE ATM service: **$38,000**
- T-1 for data plus POTS service from other carriers: **$48,000**

WAVE will be supported using VBR service, which allows for sending bursty traffic without tying up bandwidth when no information is being transmitted, such as during silences in a voice call.

During high traffic periods, voice cells get priority over other traffic to ensure voice quality, according to MFS' Hickey.

Use of VBR, while invisible to the user, is key to allowing MFS to offer lower rates, Heckart said. MFS leases long-distance lines from interexchange carriers and if it can make more efficient use of them using VBR, that savings can be passed along to the customer, she said.

Heckart said she thought the pricing would reflect what percentage of the user's traffic was voice and what percentage was data.

Selling services without bothering the user with too many technical details is a trademark of MFS, she said.

Heckart also said that the vagueness of its pricing scheme might raise eyebrows, but MFS has been historically vague about pricing and has delivered competitively priced products.

"What's critical is the bottom line. If the user can look at his existing bill and see it's 25% more [than MFS is quoting for ATM], that matters. And the customer may not have to know all the gory details," she said. ■

SNA

Continued from page 19

is hailing the IPX's closed-loop congestion management scheme, buffering of each permanent virtual circuit (PVC) and cell transport traits.

For example, Steve Hindman, AT&T frame relay product manager, said the IPX's method of throttling back traffic when the carrier network gets congested makes network delay more predictable than the open-loop platforms used by other carriers.

Those switches discard packets above a user's committed information rate (CIR) during congested periods and wastes time resending them.

Other carriers, though, said the IPX scheme could actually be a liability. "The IPX slows down [or speeds up] traffic in 10% increments, and each increment takes 40 msec," said Brad Hokamp, Sprint frame relay product manager.

Other options

Sprint uses the Alcatel Data Networks, Inc. TPX 1100, which allows transmissions to burst up to port speeds, as opposed to the IPX, which bursts only to the customer's CIR speeds. The network then allocates the traffic across spare backbone capacity, Hokamp explained.

Assuming there is spare network capacity available, this could be a throughput enhancer over the IPX, analysts said.

"The delay-don't-discard scheme can be as much of a [throughput] problem as dropped traffic," agreed David Natho, LDDS WorldCom's frame relay and ATM product manager.

LDDS WorldCom runs both an IPX-based frame relay network and one based on Cascade Communications Corp. 9000 switches.

According to Natho and analysts, a network's ability to successfully carry SNA is less dependent on the carrier's switch platform than on other factors. These include the degree of intelligence in the premises equipment for prioritizing traffic, whether users are running SNA and LAN traffic over the same PVC, and the engineering of the network with appropriate port and PVC sizes.

For example, Konica Business Machines U.S.A., Inc. in Windsor, Conn., has shifted from LDDS WorldCom's IPX net to its Cascade net and hasn't noticed any performance changes, said Brian Spears, Konica's manager of information technology. However, the Cascade switch makes it faster and easier for the carrier to make configuration changes to the Konica network, Spears said.

"I'm not at all convinced that the actual switch platform has a lot to do with the performance of SNA over a frame network."

Cell advantage?

AT&T also claims that the cell-oriented transport of its IPX backbone, albeit proprietary, makes the time to receive data more predictable than do variable-length frames.

However, other switches also use cell-based backbones (see graphic, page 19). Those switches use larger cell sizes, and Sprint's Hokamp contended that the larger cell sizes mean less overhead wasted by chopping frames into cells.

AT&T's Hindman noted that the IPX switch allows AT&T to assign traffic buffers to each PVC rather than on a per-port basis. If a port is shared by multiple PVCs and the user has a PVC dedicated to SNA traffic, he explained, prioritization could be lost at the port level.

The Cascade switch, for example, uses one buffer that is shared by many traffic lanes. However, the buffer is large, and the switch uses DS3 links between nodes so that less queuing is required.

The Bay Networks, Inc. BNX switch used by MCI also runs DS3 internodal frame-speed links and supports the option for 155M bit/sec Asynchronous Transfer Mode cell-based transport, said David Schantz, Bay's WAN software product line manager.

And, like the IPX, the Alcatel switch can buffer on a per-PVC basis, Hokamp said.

AT&T recommends that users dedicate SNA traffic to its own PVC rather than intermingle SNA and LAN traffic, which can hog bandwidth. In April, the carrier adjusted its pricing structure to lower PVC costs (while raising port costs) to make adding PVCs less expensive; PVCs can share ports.

From a pricing perspective, LDDS WorldCom charges for the cumulative amount of PVC bandwidth attached to a port, not for the number of PVCs, so dedicating PVCs to SNA is not necessarily a cost concern. But LDDS WorldCom's Natho said that the carrier generally recommends dedicating a PVC to SNA "when the CPE is not very intelligent" about prioritization.

Hokamp suggested that while "IP and SNA can run together peacefully," he would recommend a separate PVC if the user was running Novell, Inc. IPX traffic, which is more of a bandwidth glutton. Sprint prices PVCs on a declining-pricing scale — the more PVCs, the less expensive each one is — to help users needing extra PVCs for SNA traffic.

More than the switch

The jury is still out on the importance of the carriers' switch platforms compared with their consulting and design expertise for handling SNA.

"I'm not at all convinced that the actual switch platform has a lot to do with the performance of SNA over a frame network," said Steven Taylor, president of Distributed Networking Associates, a consulting firm in Greensboro, N.C. "More important are the

See **SNA** *page 25*

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WAN MONITOR

FUNI you should mention that

A few columns back, we talked about the role of frame relay in ATM service interworking. The column generated a lot of E-mail, with many readers asking about this new interface called FUNI.

When Shakespeare asked, "What's in a name?" he must have had a premonition about FUNI (pronounced "foo-nee"), which stands for Frame User Network Interface.

To save everyone a lot of confusion, FUNI should have been called the Low-Speed ATM Interface. It says more about what FUNI actually does, which is to connect lower speed sites into ATM networks.

Frame relay-to-ATM service interworking allows the transparent linking of frame relay sites (and equipment) to ATM sites (and equipment). The network service performs a transparent protocol conversion between frame relay and ATM.





Daniel Briere and Christine Heckart

There are few downsides to this: Basically, you get investment protection in your services, equipment and knowledge base, the ability to use frame relay now, and the ability to scale some of your sites up to ATM in the future without making any changes to your frame relay network.

It's a great solution. FUNI is low-speed, frame-based ATM. The only difference between FUNI and frame relay is that with FUNI, all of the signaling and flow control can be extended to the customer premises equipment. This would be useful for available bit rate services and would also apply to end-to-end signaling on switched virtual circuits.

If your goal is to primarily support data applications — from 56K through 1.5M bit/sec — and you might need ATM at a few key locations someday, then frame relay is the best choice, hands down.

Don't sit around waiting on FUNI, which may or may not ever mature. Implement frame relay now. Use ATM at your largest locations in the future and then use frame relay-to-ATM service interworking for interconnectivity.

If you need high-speed interconnectivity between several locations to support a range of applications, ATM might be a good solution for you. If this is the case, and you later have a few sites with many different applications that need low-speed connectivity (below 1.5M bit/sec) into this ATM network, you might want to consider FUNI instead of frame relay.

This is because the ATM network is already in place and you are just adding a few low-speed ATM sites.

The FUNI standard is still in the early stages of development, and there are still many areas of controversy, unlike frame relay, which is widely available and relatively stable today. It may be possible that FUNI and frame relay could converge in the future, making this whole discussion about as useful as a compass on the Starship Enterprise.

Oh, and change the name.

Briere is president and Heckart is director of broadband at TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at danny_briere@telechoice.com or at christine_heckart@telechoice.com. They share this space with Scott Bradner, whose column will appear next week.

SNA

Continued from page 24

peripherals, such as how [FRADs] handle SNA spoofing."

Christine Heckart, director of broadband services at TeleChoice, Inc., a consulting firm in Verona, N.J., agreed. She cautioned, though, that traditional carriers do not have much expertise in SNA, and protocol issues such as addressing do not usually pop up in the "WAN equipment they are accustomed to supporting." She warned users not to expect end-to-end managed network expertise from the carriers right away. ■

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Briefs

■ **Novell, Inc.** *plans to ship early versions of its* **NetWare client for Windows 95** *to users by the end of September. The client is the first of Novell's line of Client32 products, which will be developed to provide 32-bit connections from various desktops to NetWare.*

The new clients will support NetWare Directory Services and include the NetWare Application Launcher, a button bar to launch applications running on a NetWare server.

The Windows 95 client will also let users assign long names to files on their NetWare servers. The prerelease version will be available on Novell's CompuServe forum, and its FTP and World-Wide Web sites.

The final version is due in late November.

Novell: (800) 638-9273.

■ **Advanced Micro Devices, Inc. (AMD)** *of Sunnyvale, Calif., last week announced a* **single-chip media access controller** *supporting the IEEE 802.11 standard for wireless LANs that should help bring down the cost of wireless products.*

PCnet-Mobile can be designed onto PCMCIA cards, adapters, PC motherboards or access points that connect mobile users to the network.

Pulse Engineering, Inc. has already committed to integrating AMD's chip into its wireless LAN cards, which will cost about $169 each.

PCnet-Mobile chips are priced at $29 in quantities of 1,000 and will ship in the third quarter.

AMD: (800) 222-9323.

■ **Meridian Data, Inc.** *this week will introduce* **CD Net 5.0 for VINES,** *which makes data on CD-ROMs accessible via workstations on Banyan Systems, Inc. networks.*

The product operates on a dedicated PC or CD-ROM server and is priced at $1,195 for an unlimited-user license.

Meridian: (408) 438-3100.

Palindrome to deliver enterprise backup tool

VISTA helps coordinate storage across multivendor LANs.

By Kevin Fogarty
Naperville, Ill.

Palindrome Corp. last week announced agent-based software for coordinating from a single console the backup of servers across the enterprise and parceling out backup responsibility to administrators in different sites.

Visual Storage Administrator (VISTA) is designed to simplify the management of Palindrome's Backup Director and Storage Manager products, both of which reside on individual servers and previously had to be managed separately.

The product will work across Novell, Inc.'s NetWare, Microsoft Corp.'s Windows NT and various Unix-based LANs.

VISTA answers a crying need among network managers for central administration and control of backup and storage across the net, said Patrick McBride, an analyst with consultancy META Group, Inc. in Reston, Va.

While Palindrome's offering does not provide as much flexibility and local control as users would like it to, McBride said it is an improvement over existing products, most of which can only send traps and alerts to network management applications.

VISTA consists of a workstation-based console and intelligent agents that reside on servers running Backup Director or Storage Manager, plus a hub application that runs on a server and collects information from agents across the network.

After gathering this data, the hub sends alerts and status reports, on request, to a Windows-based VISTA console. It also can send alerts to other management applications through Simple Network Management Protocol by way of electronic mail across Novell's Message Handling Service (MHS), via fax or pager using third-party products, or across NetWare LANs using the SEND command.

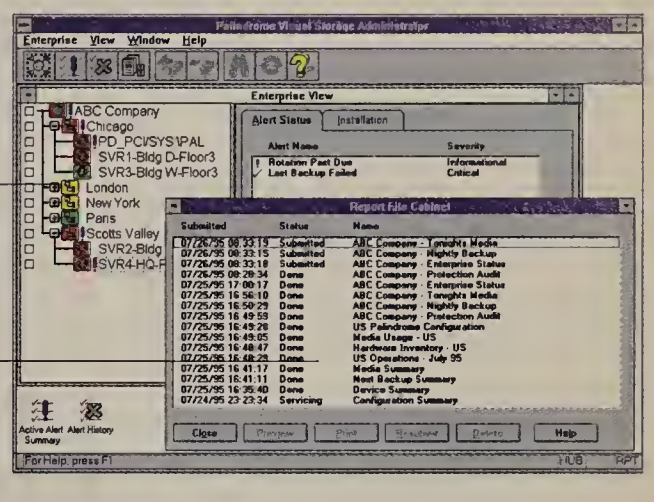
In addition, the product can create a history for each server, generate trouble tickets that contain information about the severity of alerts and can automatically clear alerts that have expired or have been resolved.

VISTA can build a queue of

See **Palindrome,** *page 34*

Palindrome's VISTA displays backup and storage data on servers throughout the enterprise . . .

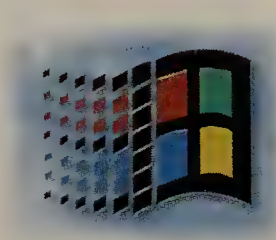
. . . and produces on-demand reports on their status and backup history.



Windows 95 apps come down the chute

By Peggy Watt and Jodi Cohen
Redmond, Wash.

A pack of vendors last week hung on to the coattails of Microsoft Corp., introducing a selection of new and upgraded net products in conjunction with the launch of Windows 95.



Farallon Computing, Inc. of Alameda, Calif., announced a Windows 95-compatible version of its Timbuktu Pro for Networks software, a client program that lets users access remote servers for file transfers and other activities.

Version 1.1 of the software includes PPP support and works with the Windows 95 Plus dial-up server for secure dial-up access to the network. The software enables Windows 95, Windows 3.1, Windows 3.11 and Macintosh clients to access remote servers, such as Windows NT systems, Shiva Corp.'s LANRover and 3Com Corp.'s AccessBuilder.

Timbuktu Pro for Networks 1.1 will be available in October as a free upgrade for registered users.

Also last week, MobileWare Corp. of Dallas extended wireless connectivity functions to Windows 95 with the introduction of MobileWare 3.0.

The client/server offering is designed to let users connect to corporate LANs via cellular, Cellular Digital Packet Data, ISDN and X.25 links.

MobileWare 3.0 supports the universal in-box in the Exchange Client built into Windows 95, as well as Microsoft Mail and Lotus Development Corp. cc:Mail. It configures on a laptop system automatically through Microsoft's Plug-and-Play standard. The server component runs on Windows 3.X, Windows 95, Windows for Workgroups or Windows NT.

Net managers can also use MobileWare to support and manage a mobile user network.

MobileWare 3.0 communications server is priced at $4,600 and, through 1995, includes a 10-user license; additional user licenses are priced beginning at

See **Win95,** *page 34*

Wireless devices offer voice, data connectivity

By Jodi Cohen

A pair of wireless network equipment vendors — Laser Communications, Inc. (LCI) of Lancaster, Pa., and Southwest Microwave, Inc. of Tempe, Ariz., — have unveiled building-to-building connectivity devices that support simultaneous voice and data links.

Both companies' products can be used to interconnect buildings where laying fiber or installing a leased line is impractical due to cost or physical barriers.

The wireless network boxes attach to a hub, switch or router at one building and transmit traffic to a mirror image of the setup at a second building.

LCI's OmniBeam 2000 device uses laser-optic infrared technology for running T-1, Ethernet or token-ring links that are as far as 1.2 km apart. The device is designed for usage where a LAN and private branch exchange must be simultaneously connected between two sites.

as well as a radio unit that is mounted on top of each building.

The radio device operates in the 23-GHz frequency and is

Wireless wares

Company	Product	Pricing	Availability
Laser Communications	OmniBeam 2000	$17,500	Now
Southwest Microwave	FastWave 875	Starts at $10,990	September

Unlike OmniBeam 2000, Southwest Microwave's FastWave 875 LAN system is based on a microwave wireless link, which requires a Federal Communications Commission license.

The wireless system includes Microwave LAN Transceiver, which attaches to a central networking device at each site,

capable of extending Ethernet and T-1 connections across distances of as much as 3 miles.

When configured with T-1 links, FastWave 875 is well suited for videoconferencing or multimedia applications.

Esmerelda Silva, an analyst at International Data Corp., a con-

See **Wireless,** *page 30*

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New service provides 'Net access via LAN E-mail

By Peggy Watt
San Francisco

Start-up Fabrik Communications, Inc. this month will unveil a combination product and service that gives LAN users secure Internet mail access.

The offering builds on existing LAN-based electronic mail systems, enabling users to send and receive Internet mail by the same methods they use to exchange messages locally.

Software running on a LAN-based messaging server calls on Fabrik Service, which provides the interface to the Internet as well as airlock-style security. The service assigns a custom domain name for all users on a company's LAN and handles Internet mail transmissions at scheduled intervals via high-speed modem or ISDN lines.

Fabrik provides around-the-clock monitoring and support.

Testing the 'Net with mail

"We wanted to test the waters of the Internet, but we knew we at least needed a mail connection," said Dave Gwilliam, network manager at BancTec, Inc. in Dallas. The company has been beta-testing the Fabrik product since the spring and recently deployed it to 1,900 end users worldwide.

An advantage of going with Fabrik is that "users don't have any learning curve" in gaining Internet access, according to Gwilliam.

David Mur, network administrator at First Franklin Financial Corp. in San Jose, Calif., agreed. As a beta tester, Mur installed the Fabrik system so that the financial institution could more efficiently distribute mortgage rate data to its brokers. Now, about 200 users in two dozen branches rely on Fabrik's extension to its LAN-based mail.

"It's cheaper than a full-blown Internet service, and we don't have a need to give employees access to anything else on the Internet," Mur said.

Fabrik's offering currently works with cc:Mail from Lotus Development Corp., but the company is developing versions for other popular E-mail programs, including Microsoft Corp.'s Mail and Novell, Inc.'s GroupWise. A version to interface with Microsoft Exchange is also planned.

In addition, Fabrik can provide gateways to CompuServe and MCI Mail, and expects to add a gateway for The Microsoft Network.

Prices include a monthly charge of $60 per customer site connection and are also based on volume of use and message sizes, starting at 20 cents per message and with surcharges for attachments starting at 3 cents per kilobyte.

✆ Fabrik: (415) 986-4933.

RealityCheck

Product
Fabrik

Company
Fabrik Communications

The benefits
- ▲ Offers easy, secure Internet access.
- ▲ Builds on existing E-mail.
- ▲ Provides 24-hour service support.

The drawbacks
- ▼ Only supports cc:Mail.
- ▼ Mail access not instantaneous.

The user view
"It's so simple, it's really brainless. The whole company gets Internet mail access with no added training."
David Mur, First Franklin Financial

Wireless

Continued from page 27

sulting firm in Framingham, Mass., said having voice and data links in the same product is a big advantage.

"I'm not aware of many vendors offering simultaneous LAN and T-1 connectivity," she said. "When you're doing building-to-building links, you're obviously going to want some T-1 configuration."

Unlike most microwave solutions that are quite large, Southwest Microwave's FastWave 875 is easy to install, according to Silva.

FastWave 875 has a compact antenna for the microwave radio to simplify installation and alignment. The entire unit weighs less than 7 pounds, which lets users quickly mount the device without special equipment.

OmniBeam 2000 is priced at $17,500 and is available now. FastWave 875 pricing starts at $10,990 and will be available in September.

✆LCI: (800) 527-3740; Southwest Microwave: (602) 968-5995.

BusinessBriefs

Token-ring switch vendor **Nashoba Networks, Inc.** of Littleton, Mass., has announced the addition of **Sean Welch** as vice president of sales. He will be responsible for expanding and supporting Nashoba's customer sales and service efforts.

Prior to joining Nashoba, Welch was director of international sales and marketing at Synernetics, Inc., which was acquired by 3Com Corp. in 1994. Welch also held sales positions at Spider Systems, Ltd. in Europe and at Hewlett-Packard Co.

Computer-industry executives usually won't comment on buyout rumors, but that doesn't mean they don't profit from them. Recent rumors that **IBM** wanted to buy **Novell, Inc.** pushed Novell's stagnant stock to over $20 a share, prompting profit-taking by at least three top Novell execs.

Sales czar Joe Merengi parted with 1,142 shares and chief counsel David Bradford peddled 14,000 shares, both for $20.88 a share. Also, Ernest (Tim) Harris, Novell's senior vice president of human resources, sold 11,000 shares at $20 apiece, according to Securities and Exchange Commission reports.

It was far from a sell-off, however, since all three still maintain substantial Novell holdings.

NET RESULTS

NOS-based directories can lend a helping hand

Eight.

That's the figure we arrived at recently when we tallied the number of different passwords and logons required to access the various databases, servers and hosts we need to do our jobs during the course of a day.

It's not just the number, but the various limitations that come with each password. We tried using the same password eight times, but some systems required up to six numbers while others demanded at least eight. Some required a combination of letters and numbers, while others had to be changed every 30 days and never to a password you had used before.



Skip MacAskill and Melinda Le Baron

We were kvetching about that in the office hallway when one of our many network operating system gurus, Bob Gill, happened by.

"By crimminy, all you two do is complain," he said. (He didn't really say "by crimminy," but this is considered a family trade journal in at least 22 states.) "Develop a good NOS-based directory service and be done with it."

As analysts, we were naturally intrigued, so we asked Bob to honor us with his views on the subject. Being a fellow analyst, he readily agreed.

It seems that single logon is only one of the demand drivers for the use of directory services in a LAN-based environment. According to Bob, administrative issues and more intelligent applications are the other two.

■ **Single logon.** In most interconnected LAN implementations, a user must manually log on to each server or host that must be accessed.

"Not only does this eliminate any sense of network or location transparency, it is time-consuming, expensive and annoying, at best," Bob said. "At worst, users are shut off from the information they need to do their job and network managers are forced to implement inefficient work-arounds."

With a directory service, however, a user may log on just once to a set of interconnected resources, and authentication and data location are transparent.

■ **Administrative efficiencies.** Network implementations that lack directories will experience duplicated efforts, which, Bob pointed out, increase exponentially with each additional system tied into the network.

"Without directories, every user change must be replicated manually across not only the servers to be accessed, but also the hosts and other off-network resource gateways," he said. "With directories, an administrator only has to change a user's profile once in the directory database."

Most LAN-based directories include administrative tools that allow templates of types of users, groups of users and even groups of resources to be defined, which can eliminate a great deal of directory administration.

■ **Directory-intrinsic applications.** A directory can also provide distributed intelligence to client/server applications. "Beyond simple mail and messaging applications, this includes an application's ability to locate and use the data and tools it needs to accomplish its tasks in a dynamic fashion," Bob said.

The likelihood of success for directories in this space, however, is far more problematic than in the first two cases.

This is because it is easier to introduce a NOS-specific administrative or user logon capability than it is to generate enough demand for an application-to-directory interface that works across platforms to attract independent software vendors.

Well, if all this is true, we asked, how come NetWare and VINES haven't had greater impacts?

"The reasons are the homogeneity of the platforms that can be accessed by the directory and the lack of applications servers," Bob said.

While Banyan and Novell have used their directories to solve their own problems, they have ignored the issue of integrating the rest of the enterprise.

Integrating all the file servers under one directory is a step in the right direction, but it will never be an enterprise solution if the benefits cannot be extended to other elements of the environment.

"With an onslaught of directory options for the NOS, desktop operating system and messaging applications, corporate planners are unlikely to leap hastily on any single solution as the corporate standard," Bob said. "NOS directories will play a key enterprise role only after they are broadened to a majority of application platforms, and after directory-intrinsic applications have been delivered and used successfully."

MacAskill is a senior research analyst and Le Baron a research director for Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at (203) 967-6700.



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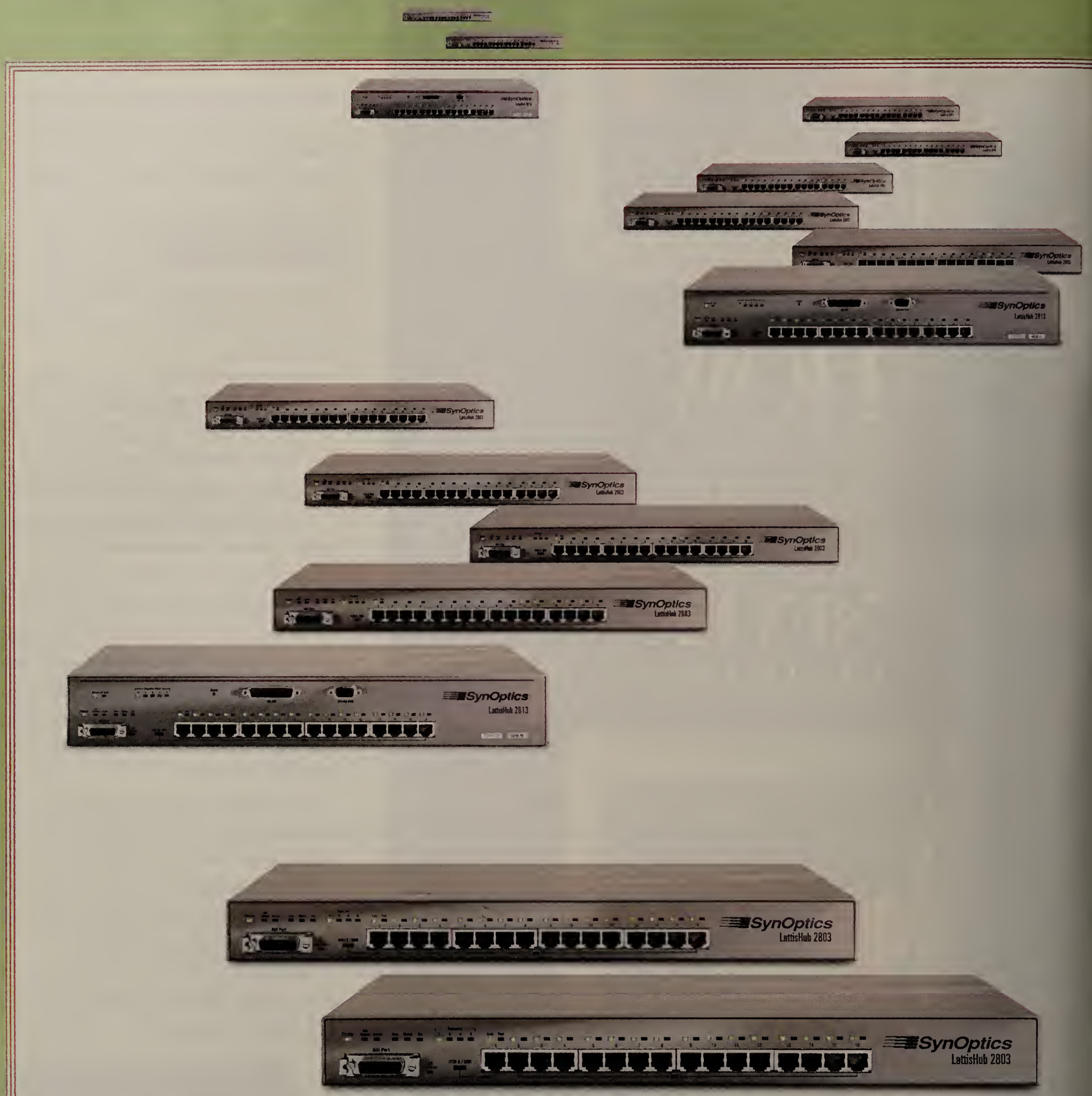
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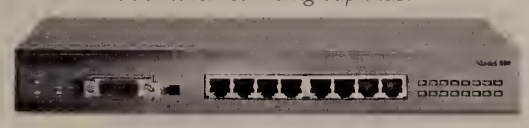
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Circle Reader Service #47

SCO, French firm team to call on telecom market

By Peggy Watt
Santa Cruz, Calif.

The Santa Cruz Operation, Inc. (SCO) last week announced at its annual user conference plans to stretch its Unix software beyond the LAN server and into the telecommunications market.

The firm also discussed moves designed to make its SCO OpenServer 5 Unix operating system play better in mixed Unix and Windows nets.



"SCO is providing new ways to integrate Windows clients with Unix servers to let businesses use distributed systems efficiently and cost-effectively."
Alok Mohan, SCO's president and CEO

SCO will call on the telecommunications market by teaming with the French firm Chorus Systems, Ltd. to integrate SCO OpenServer 5 Unix with Chorus microkernel technology. The combined technology, called the SCO Telecommunications OS Platform, will run private branch exchange and other telecommunications switching systems, including new PC-based ones.

"It is a major initiative for SCO and an expensive project in engineering resources but a strategic new market for us," said David Cess, director and general manager of SCO's new telecommunications business unit, based in the U.K. Cess said SCO is eyeing public as well as private switching applications, including support for broadband systems.

SCO and Chorus have begun development, and SCO value-added resellers and system integrators are already exploring options, Cess said. But a product is unlikely to emerge for at least another year. SCO will also market utilities and developers' kits for its new telecommunications platform.

Windows integration

Also at the conference, SCO recognized the need to integrate its software with Windows 95 and Windows NT.

The firm enhanced its Windows Friendly program with new technology called Wintif 95, which lets Unix developers and users dealing with X Window applications mimic Windows 95's interface without modifying their applications.

The product is scheduled to be available in October. SCO also announced an agreement with Mainsoft Corp., a vendor of software for porting Windows applications and tools to Unix systems. Mainsoft agreed to implement its 32-bit Windows development tools on Open Server by year-end.

In addition, SCO has formed alliances with several other software developers. Among the new partners is Cheyenne Software, Inc., which will port its ARCserve/Open backup technology to OpenServer by early next year. Also, SCO has licensed systems management technology from Go Ahead Software, Inc. to extend OpenServer's management of remote clients.

✆SCO: (408) 425-7222.

Win95

Continued from page 27

$925 for five users. MobileWare 2.5 users can receive a free upgrade.

Other vendors rolling out new Windows 95 applications include:

■ Lanworks Technologies, Inc. of Toronto is shipping BootWare, programmable read-only memory chips that offer a server-based boot or installation option for Windows 95. Net managers can install Windows 95 on the server and configure nodes to let users run or install the operating system at their workstation. BootWare ROMs support a variety of network interface cards, including fast Ethernet LAN adapters. BootWare for Win95 is priced at $39 per workstation.

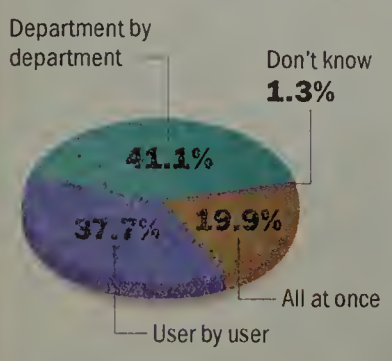
■ Symantec Corp. of Cupertino, Calif., is shipping a suite of Windows 95 utilities, including Norton Desktop Administrator, to help network managers install and configure Windows 95 workstations.

The company is also providing 32-bit versions of Norton Utilities and Norton AntiVirus. Norton Desktop Administrator is available beginning at $450 for a 10-node pack, Norton Utilities for Windows 95 costs $119, and Norton AntiVirus for Windows 95 is priced at $79.

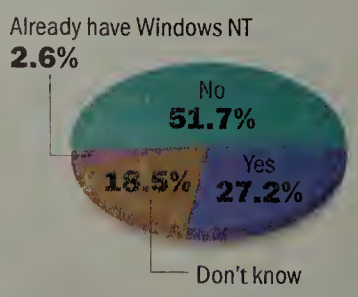
✆Farallon: (510) 814-5100; MobileWare: (800) 260-7450; Lanworks: (800) 808-3000; Symantec: (800) 441-7234.

A SAMPLING OF WINDOWS 95 SURVEY RESULTS

How will you upgrade to Windows 95?



Will your move to Windows 95 be accompanied by a move to Windows NT Server?



Results are based on a survey of 151 users interviewed by Focus Data of Framingham, Mass.

GRAPHIC BY TERRI MITCHELL

IBM prepares its new NOS contender

By Kevin Fogarty
Austin, Texas

IBM has begun shipping beta copies of OS/2 Warp Server, a version of OS/2 aimed at both the file-and-print server and general applications server markets.

The product could be a solid file and application server, but its initial lack of support for net directories and multiprocessing hardware will hurt it in competition with Novell, Inc. and Microsoft Corp., analysts said.

OS/2 Warp Server combines the network administration and file-serving capabilities of LAN Server 4.0 with the 32-bit preemptive multitasking engine of OS/2 Warp. It also includes a utility to migrate NetWare 2.X and 3.X users to OS/2 Warp Server.

In addition, the software comes bundled with connectivity and management tools. Also in the bundle are IBM's LAN Distance Remote remote node support, IBM Networking Solutions backup and recovery products, an Internet Access Kit and a World-Wide Web tool called WebExplorer.

The network operating system supports clients running Windows 95, Windows NT, Windows 3.X, DOS, OS/2 Warp and MacOS.

OS/2 Warp Server's crash protection, multitasking capabilities and ability to support applications based on a variety of desktop operating systems could make the IBM offering an attractive applications server, said Rob Enderle, an analyst with Dataquest, Inc. in San Jose, Calif.

But its initial lack of support for a directory will make the IBM product look inferior to NetWare and its NetWare Directory Services, which seem to be gaining momentum, Enderle said. OS/2 Warp Server's inability to run on multiprocessing systems immediately will hurt it in competition with Windows NT, he added.

IBM officials said support for Distributed Computing Environment directory services and symmetric multiprocessing are planned but may not be available when the product begins shipping early next year.

✆IBM: (800) 879-2755.

Palindrome

Continued from page 27

reports detailing the alerts it has received and the configuration of servers and storage devices — including storage media available — as well as current status, time of last backup and when new storage media are required for each server.

The design makes for reliable central control of backup and hierarchical storage management because there is not one central point of failure, Palindrome officials said.

A starter kit that includes a VISTA Console and five server-based agents is priced at $1,995. Additional consoles are priced at $795, and the agents sell in packages ranging from five servers for $1,495 to 500 servers for $79,995.

✆Palindrome: (708) 505-3300.

Accel Partners is cashing in, not out, on LANs

Q&A

Accel Partners, a venture capital firm in San Francisco, is in the business of breeding new technology companies. James Breyer, a general partner of Accel for eight years, has been involved in the founding of companies such as Centillion Networks, Inc., First Virtual Corp., UUNet Technologies, Inc. and a host of other network and software players.

Network World Senior Writer Michael Csenger recently spoke with Breyer to discuss the outlook for new growth in the LAN internetworking arena.

Given the number of Asynchronous Transfer Mode and LAN switching start-ups out there, have you moved on to other areas?

We actually want to add more companies to that side of our portfolio. We have three or four companies now that are involved with ATM internetworking, and we should have about six to 10.

What would they be doing differently than the companies already involved now?

ATM is getting simplified at the hardware level. It probably doesn't seem so in the market right now, with interoperability issues and basic standards still waiting to be drawn, but the underlying switching function is going to be commoditized by mid- to late '96.

So what we see now are a lot of entrepreneurs with software-intensive approaches to ATM. They may target just one protocol, say IP over ATM, or edge routing over ATM.

Will end users ever know about these companies? Is the idea to provide software funcionality that the larger vendors incorporate through OEM deals or are you talking about actual products that users will buy?

Actual products. The OEM arrangement you describe already exists. Some companies sell basic signaling software or protocol stacks to the larger vendors, which incorporate the technology and then add their own feature set on top of it.

What you're going to see instead are start-ups that just OEM their hardware from a switch maker and build products entirely on their own value-added software functionality.

How are these companies going to get into the market?

There's a lot of doom and gloom in the investment community when it comes to internetworking because of the distribution leverage of Cisco, Bay and 3Com.

When you start talking about software-based products running over commoditized hardware, though, new possibilities for distribution begin to emerge. Something like Internet-based marketing may well have an impact on what distribution looks like down the road. ■

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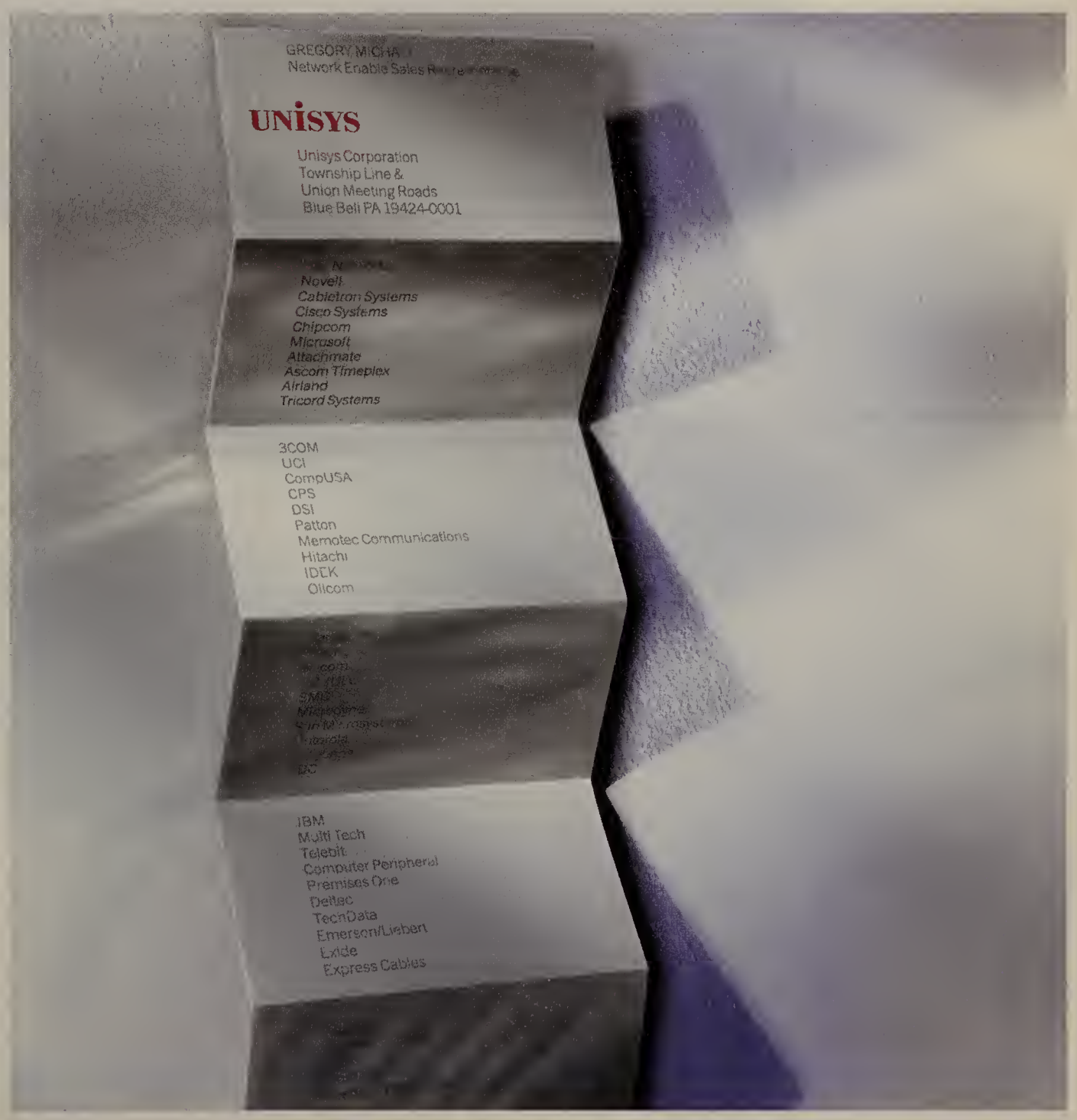
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MARY: "In this business, change is constant. Evolving customer preferences, new software releases, changing product inventories... staying on top of it all and keeping customers informed requires immediate access to the latest information. Our information system keeps it all at our fingertips."

PATRICK: "With Btrieve, we've built a client/server system that's more than flexible. From inventory control to store management and POS systems, Btrieve delivers rock-solid performance, it's virtually maintenance-free, and it's incredibly easy to use."

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MARY: "The system is so intuitive, our store staff requires very little training. We don't even need the manual. This means our staff can concentrate on serving the customer rather than serving the system."

PATRICK: "As Babbage's grew to over 330 stores, Btrieve grew with us seamlessly. We see no limit for our company's future. And we see no limit for Btrieve."

For the complete Babbage's story, call Btrieve Technologies, winner of the 1995 RealWare Award at DB/Expo.

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Briefs

■ **TechGnosis, Inc.** *in Burlington, Mass., last week announced Version 3.0 of its SequeLink* **database middleware,** *which creates a high-performance SQL connection between multiplatform desktops and an array of relational databases.*

The new version, now available on Windows NT and Macintosh, allows desktop applications to use an Open Database Connectivity driver to access networked databases but still take advantage of vendor-specific database features. A five-user license starts at $1,495.

TechGnosis: (617) 229-6100.

■ **Intersolv, Inc.** *in Rockville, Md., has begun shipping* **DataDirect ODBC 2.10 Driver Pack,** *a collection of drivers for use in building Open Database Connectivity applications.*

The DataDirect ODBC 2.10 Driver Pack costs $499, and individual drivers sell for $99 each.

Intersolv: (301) 838-5000.

■ **CommTouch Software, Inc.** *in San Mateo, Calif., next month will ship Pronto Mail 2.0, a* **TCP/IP mail client.** *Version 2.0 includes a new mail synchronization feature that lets users work from PCs at the office, home or on the road, keeping mail current on all computers.*

The software costs $69.

CommTouch: (415) 578-6580.

■ **Maxsoft-Ocron, Inc.** *in Fremont, Calif., next week will announce* **ClientVision,** *an imaging application development tool kit that consists of hardware and software.*

ClientVision includes Recore 4.0, the company's optical character recognition and software development tool, plus Umax Technologies, Inc.'s Page Scan Device, a desktop scanner.

Whereas traditional imaging applications require a shared high-end scanner, ClientVision is designed to be used by individuals at their workstations.

ClientVision is priced at $2,795.

Maxsoft-Ocron: (510) 252-0200.

Users give IBM database management a thumbs-up

By John Cox

Beta users of IBM's just-released DataHub for Unix said they are pleased with the tool's ability to let them manage both IBM and non-IBM client/server databases running on Unix servers.

The users said the product has an easy-to-use graphical interface, runs unattended monitoring of remote databases effectively and supports an array of administrative tasks on non-IBM databases, including those from Oracle Corp.

On the downside, users said the beta version of the product could not access some features of non-IBM databases, and fell short in turning displays and statistical data into finished management reports.

In addition, users said the initial release is missing the ability to apply operational changes, such as backups, to multiple databases at the same time.

Industry analysts said DataHub for Unix, which was released last week as expected (*NW*, Aug. 7, page 57), also needs to embrace Microsoft Corp.'s operating system platforms and work with IBM's existing DataHub for OS/2.

What it includes

DataHub for Unix consists of a workstation-based graphical display, a DB2/6000 database and agents that run on the remote system, which watch both the database server and the underlying operating system. In response to events, such as when a CPU utilization threshold set by the administrator is exceeded, the agents notify the management workstation, which references a set of rules about what action to take or whom to notify.

The problem DataHub tries to solve is a real one, as more companies find themselves with different brands of database management systems running at multiple sites.

"There's no way you can manage hundreds of database servers. Even tens of servers begin to get real complicated," accord-

See **IBM,** *page 40*

RealityCheck

Product
DataHub for Unix 1.0

Company
IBM

The benefits
- ▲ Manages multivendor, networked Unix databases from one workstation.
- ▲ Automates routine database operations.
- ▲ Displays database objects and relationships graphically.
- ▲ Features rules-based monitoring of remote databases.

The drawbacks
- ▼ Does not support Windows platforms.
- ▼ Beta version lacked ability to apply changes to multiple databases automatically.
- ▼ Is missing support for some specialized, vendor-specific database features.

The user view
"[DataHub] simplified working with Unix systems. It's just point and click. For me, you can't beat it."
Marion Rudman, Allstate

LiveWorks updates whiteboard

LiveBoard gains improved infrared pen, OLE 2.0 support.

By Annmarie Timmins
San Jose, Calif.

LiveWorks, Inc. last week introduced a jazzed up version of its electronic whiteboard system, building in support for OLE 2.0 and introducing an improved infrared pen that lets changes made to the whiteboard appear on networked PCs in real time.

The company's computer-based LiveBoard consists of a 67-inch whiteboard screen, a CD-ROM system and a video unit that can be set up in a meeting room and linked to desktop and laptop PCs across LAN and WAN links for video and document conferencing.

Mouse capabilities

The upgraded pen works like a mouse, letting users make changes to a presentation's layout and having those changes be automatically reflected on the screens of networked PCs.

The OLE 2.0 support enables users to make changes to PC-based applications and have those changes copied in real time on a networked whiteboard.

In addition, changes made to the whiteboard can be reflected in OLE 2.0-compliant PC applications. For example, a user could write in a new amount in a spreadsheet cell shown on a whiteboard and the resulting mathematical changes would be automatically made.

Other new features include an optional Pentium processor for improved performance.



LiveBoard *now lets users make changes to a presentation using an infrared pen and have those changes reflected immediately on copies of the presentation running on networked PCs.*

LiveBoard can connect as many as 31 sites simultaneously.

David Belove, director of market development at LiveWorks,

See **LiveWorks,** *page 40*

Illustra ports its database to Windows NT

By Barb Cole
Oakland, Calif.

Illustra Information Technologies, Inc. this week will announce a version of its object/relational database for Windows NT, plus a suite of tools for building Illustra applications using popular Windows-based development software.

The upgraded database and new tools are designed to woo more developers to write applications for the Illustra Server, which previously only ran on Unix, said Charles Dickerson, product marketing manager at Illustra.

The Windows NT version of Illustra Server, which can be set up using a graphical point-and-click interface, will let developers build applications within Windows and deploy them to Illustra Servers running on Windows NT and Unix systems.

Developers will also now be able to build Illustra applications using Microsoft Visual Basic or any ODBC-compliant front-end tool via a new Illustra ODBC driver.

Developers will also now be able to build Illustra applications using Microsoft Corp. Visual Basic or any Open Database Connectivity (ODBC)-compliant front-end tool via a new Illustra ODBC driver. Previously, developers were required to use C, C++ or SQL to develop applications based on Illustra Server.

Illustra Server stores complex multimedia data, such as audio, video and images, in a single database along with traditional text and numbers accessible via SQL commands. Modules, dubbed DataBlades, can be plugged into the server for specific kinds of data or access methods, such as analyzing data over time.

The new programming tools include Schema Knowledge, for navigating through database tables and customizing views of the database; Illustra Client Toolkit for Windows, which includes a SQL query builder, a Visual Basic interface and the Illustra ODBC driver; and Illustra C++ Interface, a tool that reduces the coding required to build Illustra applications with C++.

"It's important that develop-

See **Illustra,** *page 40*

DCE needed more than ever, OSF president says

Q&A The Open Software Foundation, Inc.'s (OSF) Distributed Computing Environment (DCE) is a set of standard distributed application services that can run on different operating systems. At last week's annual DCE Developers and Users Conference in Boston, attendees focused on how large enterprises are actually building DCE infrastructures.

Network World Senior Editor John Cox talked with OSF President David Tory about DCE's role and acceptance.

What's different about DCE's focus now, compared with it in 1988, when the OSF was founded?

There's been an evolution of the idea of open systems away from just Unix. Originally, we wanted a common Unix on different hardware platforms to achieve interoperable applications. Today, we're creating common layers [of services] on different operating systems.

One obstacle to DCE adoption has been that the technology is seen as being complex. Is that changing?

It is a complex system [about two million lines of C source code], but we have simplified the definition language. Tools from software vendors are simplifying application development. We're adding instrumentation to DCE to make it simpler to build in management functions and, we're adding object orientation for easier application development.

Will DCE remain popular only with very large enterprises?

DCE was developed [originally] for the large enterprise, with customized, mission-critical applications. Those problems don't apply to the LAN environment. [But] as users work with DCE, it's moved out and downward toward the desktop. We've facilitated that by separating the [DCE] clients and servers, by simplifying the client code and the RPC, and by pushing more functions to the servers.



"There's a clear heterogeneity [in users' sites], and DCE is the glue to tie it all together."
David Tory

But even smaller firms now need to interoperate with suppliers and customers, don't they?

That's exactly the problem we see: intercompany communications. The Internet is an example. Today, the Internet lacks coherent services. Our most recent technology offerings [preliminary software releases called Advanced Technology Offerings] address some of these problems. One is Java, to enable World-Wide Web distribution of data and programs. Another is DCE Web, to enable Web servers and clients to use DCE services.

Speaking of the desktop, where does Microsoft Corp. stand on DCE?

There have been a set of very consistent messages coming from Microsoft. Their intention is to use the DCE specification, especially the RPC and security model.

Microsoft sees DCE as a way to move into the enterprise. Currently, they have not officially certified their implementation.

But unofficially, they've made their implementation interoperate with Digital Equipment Corp.'s DCE implementation, which has gone through certification.

Can DCE be replaced by competing technologies?

DCE is a standard. [Widely embraced] de facto standards emerge first at the desktop or commodity level. But these won't meet the needs of what DCE was designed for, and we're extending DCE to be a federated standard. For example, DCE naming is a substantial OSF standard. We're trying to expand this to [Sun Microsystems, Inc.'s] ONC, to NetWare and to the Microsoft environment. ■

IBM

Continued from page 39

ing to Marion Rudman, staff software programmer at Northbrook, Ill.-based Allstate Insurance Co., a DataHub for Unix beta tester.

Allstate is testing DataHub for Unix to manage DB2/6000 and Oracle databases running on RISC System/6000 servers from a central site. Currently, the firm manages databases from four regional data centers.

Instead of reading text files, administrators now scan charts and graphs that show the database's status, including how much CPU power is being absorbed by different workloads.

The IBM database management tool has proven easy to set up and use, Rudman said.

"[The GUI] asks you for three or four parameters, and it does all the rest for you," he said. DataHub displays the operations that are unique to each target database, allowing Rudman — who acknowledged that he is not an Oracle expert — to effectively manage Oracle databases.

At beta tester KLM Royal Dutch Airlines, A.V. in Amsterdam, the IBM product is effectively managing a non-IBM database environment. KLM keeps engineering and maintenance information in 30 Oracle databases on 11 networked RS/6000 servers at Amsterdam's main airport, according to Erik Reitsema, database administrator with the airline.

"There is nothing from Oracle at this time that could manage several databases divided over several machines," Reitsema said. Using Oracle tools, database administrators had to log on to each database separately, examine the database activities and try to interpret what they saw, he said. With DataHub, "you can manage all the databases, regardless of where they are situated," Reitsema said.

Instead of reading text files, administrators now scan charts and graphs that show the database's status, including what files are being heavily accessed and how much CPU power is being absorbed by different workloads.

During the beta-test phase, KLM had to write a series of Unix and SQL scripts to handle a variety of functions — such as importing and exporting data from Oracle databases — that were not well supported in DataHub. Reitsema said IBM plans to continually add specific Oracle and other database functions to DataHub over time.

Another requirement, according to Rudman, is for DataHub to support automatic change management. This is the ability to define a database change, such as creating a new index or changing a column from a five-digit to a nine-digit zip code, and have DataHub apply the change to all designated databases automatically. Today, the administrator still has to make changes separately at each database, he said.

IBM officials said this capability will be added. ■

Illustra

Continued from page 39

ers can pick up their friendly front-end tool and build applications that work with Illustra," according to Judy Davis, an analyst at Patricia Seybold Group, Inc., a market research firm in Boston.

MAKING ILLUSTRA MORE ACCESSIBLE

- New Visual Basic interface.
- New ODBC driver that links Illustra database to most Windows development tools.
- Illustra programming utilities are now available on Windows NT.

Users said that making Illustra Server more accessible from popular Windows development tools would be useful for building prototypes and certain mainstream applications with Illustra. However, some users believed that the complex databases typically stored on Illustra would not lend themselves to rapid development tools.

More power needed

"I've tried [Microsoft] Visual Basic, and for what I need to do, it's not powerful enough," said Diane Spaulding, senior systems analyst at Science Applications International Corp. (SAIC), a research, systems integration and engineering company in San Diego.

SAIC uses Illustra Server to maintain a repository of safety standards as well as an oceanography application.

Illustra Server for Windows NT is priced at $1,250 per concurrent user, with a five-user minimum.

The ODBC driver is priced at $99 per user, Schema Knowledge costs $695 per user, Illustra C++ Interface costs $395 per user, and the Illustra Client Toolkit is free with the purchase of any server.

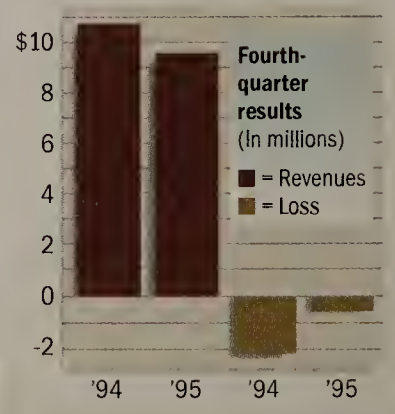
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✆Illustra: (510) 652-8000.

BusinessBriefs

Bachman Information Systems, Inc. in Burlington, Mass., last week reported that fourth-quarter revenues were down from the same period last year but that losses have been significantly reduced due to cost cutting.

For the fourth quarter ended June 30, the computer-aided software engineering and client/server application development tool vendor posted revenue of $9.6 million, down 11% from $10.8 million for the fourth quarter of fiscal 1994. A loss of $477,000 for the period, however, was down from a loss of $2.1 million for the corresponding period last year.



Platinum Technology, Inc. an Oakbrook, Ill., maker of database management tools and other software, last week completed its acquisition of **Locus Computing Corp.,** an Inglewood, Calif., company that markets connectivity and Unix emulation products.

Apple Computer, Inc. of Cupertino, Calif., this week will announce plans to incorporate **DataBeam Corp.'s** Collaborative Computing Toolkit Series videoconferencing software into its QuickTime Conferencing products.

The technology will allow users to conduct video, and audio conferences and share applications and files.

Apple: (800) 462-4396.

LiveWorks

Continued from page 39

said LiveBoard represents a new wave of collaborative tools that integrate groupware, video conferencing and document conferencing.

David Coleman, a principal at the San Francisco-based consultancy Collaborative Strategies, said the technology is interesting but doubts it will move the groupware market in a new direction.

"The groupware market is going in lots of directions," he said. "[LiveBoard] is great in presentations and electronic meetings, but that's not all of the groupware market. In fact, electronic meeting systems are about only 5% to 10% of the market."

LiveBoard is available for $34,900.

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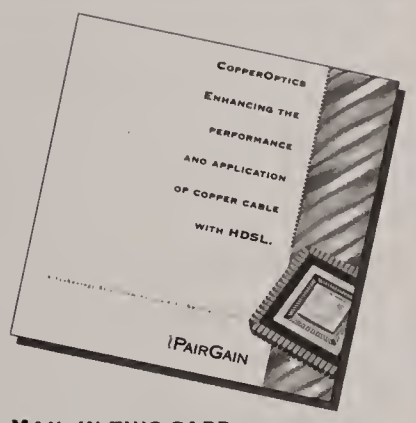
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SHARED LOGIC

Oracle's Developer/2000 leads way

If you are looking for an integrated client/server development tool that allows you to start small and then grow, check out Oracle's Developer/2000.

After years of struggling to provide a complete graphical user interface (GUI)-based solution for client/server systems, Oracle has finally arrived as a serious contender in the front-end tool set fray.

What separates Developer/2000 from the competition is its integration with the Oracle7 Server using the PL/SQL scripting language.

For corporate applications that depend on database transaction processing, a front-end tool that comes tightly coupled with the database can speed development.

Many organizations have been unable to take advantage of Oracle's earlier front-end tools because of limitations that these tools placed on GUI design and flexible application development. Developer/2000 has eliminated these obstacles by providing not only a robust set of on board GUI tools, but also by supporting—at least in the Windows environment—Visual Basic 3.0 VBX files.



Mark Myers

If you need to deliver information technology support to an organization whose requirements change frequently, then you might want to look at Developer/2000 for its strong scalability and portability features.

On the scalability side, Developer/2000 allows you to create a database application for a workgroup or even a single PC and scale it all the way up to a symmetric multiprocessing supercomputer without recoding or reoptimizing data access routines.

This is possible because Oracle uses a standardized database engine in all of its product offerings.

On the portability side, Oracle has always been a front-runner. Once created, you can deploy Developer/2000 applications under Windows, Macintosh or Motif windowing systems. The back-end database can be deployed in any of the 140-plus Oracle-supported operating environments.

Portability, however, comes with a price tag: To be successful, you should develop your application from Day One with the intention of porting so that you remember to isolate and modularize any platform-specific code.

While the product is good, it's not cheap. Each Developer/2000 license retails for $3,995, and the maintenance license costs $2,500 per year.

Also, there is one design gotcha that you'll want to know about if you decide to take the integrated Oracle approach: Beware of data-driven application design. With Developer/2000's tight database integration, it seems almost natural to design screens that closely resemble the formats of the underlying database tables. This is almost always a mistake.

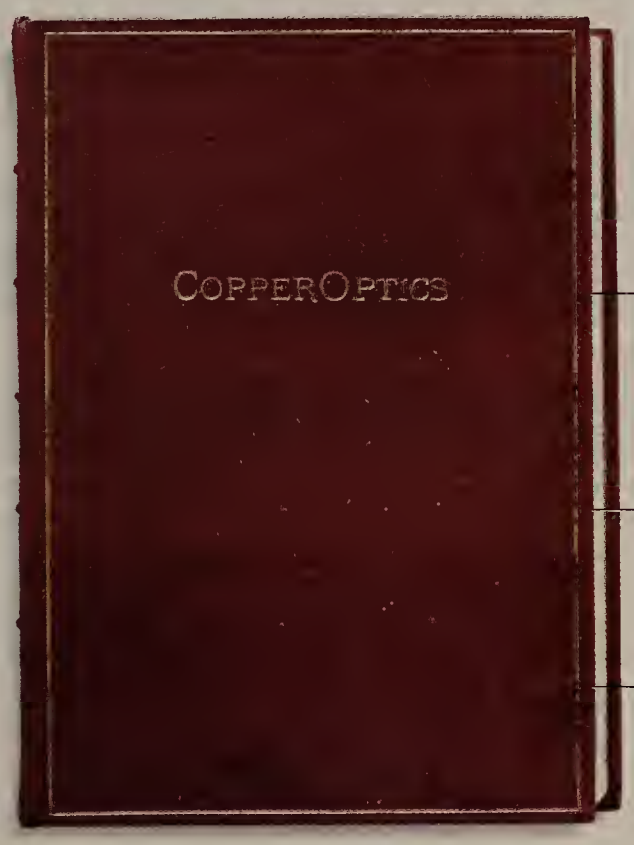
Unlike technologists, users don't think in terms of tables, arrays and complex data structures. They just want to get their work done. So make sure the GUI represents the users' view of their tasks at hand. If you can afford it, Developer/2000 offers a visionary approach to client/server development. In addition to the features already mentioned, it offers an object-oriented development environment, it can serve as an OLE container, and it supports database links via the Open Database Connectivity specification and OLE to all the major database servers.

It even allows you to partition application logic between the clients and the server to optimize a program for specific network configurations.

If someone asks you what second-generation client/server is all about, Developer/2000 is it.

Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass., firm specializing in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726. Myers' column alternates in this space with that of META Group, Inc.'s Mike Rothman.

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Circle Reader Service #61

Special Focus

LOTUS NOTES

Third-party products helping users to bridge Notes information gap

By Barb Cole

Driven by the widespread deployment of Lotus Development Corp. Notes, a spate of new tools has cropped up to help companies incorporate legacy data into the groupware application.

While the Lotus software has built-in replication technology for copying data among multiple Notes servers, it lacks facilities to easily move data between Notes and other data sources. That's where companies such as Casahl Technology, Inc., Information Builders, Inc. (IBI) and Trinzic Corp. are stepping in.

"Notes has become strategic in many organizations. But the key barrier to building strategic applications around Notes is still the integration of Notes information with data from relational systems and desktop applications," said David Marshak, vice president and senior consultant at Patricia Seybold Group, Inc., a market research firm in Boston.

While relational databases are ideal storehouses for transactional systems because they offer bulletproof security and are optimized for fast data retrieval, they are less flexible when it comes to manipulating the data they store and have limited hooks to electronic mail systems.

Notes, on the other hand, lets users mine data more easily and share that information around the organization, but it is not considered as secure as relational systems.

Some determined users have written their own C programs to mix Notes and legacy data or have used some of the data transfer facilities within Notes (see story, this page). But users are increasingly looking at tools specifically designed to handle a wide array of data sources, Marshak said.

Dividing the market

Marshak divides the market for Notes data integration tools into three categories.

At the high end are tools that let users exchange Notes data with multiple data sources residing on a broad range of platforms including mainframes. The middle-tier products are aimed at moving data between Notes and desktop applications and low-end servers. The low-end offerings are designed to move data from a desktop database, such as Microsoft Access, into Notes.

Trinzic's InfoPump and IBI's Enterprise Data Access/SQL Copy Manager for Lotus Notes are aimed at the high end of the market and are both typically sold with consulting services.

Also in this high-end space is Casahl Technology's Replic-Action, which copies data across Notes and several relational databases; it became available last month. Unlike the Trinzic and IBI products, however, Replic-Action looks like a Notes application, which analysts said makes it easy to work with.

Brainstorm Technologies, Inc.'s DataLink and the slightly higher end Percussion Software, Inc. Notrix Composer are geared more toward moving data between Notes and desktop applications and low-end servers.

In the field

Using these Notes add-ons has made marrying Notes and relational systems less daunting, users said.

Joe Roblee, network manager at Alex Sheshunoff Management Services, a bank consulting firm in Austin, Texas, said Notrix enabled him to synchronize 40 Notes databases running on laptops with the company's main Oracle Corp. database.

"We use Notrix to pull nightly updates from Oracle and add them to the Notes databases on our consultants' laptops," Roblee said. "This way, they have the data locally and don't have to find a phone line to dial in to the [Oracle] server." Notrix is also used to move magazine articles from laptop magazine databases to a Notes archive database every two weeks.

Prior to using Notrix, Roblee's team had to write lengthy macros to move data between Notes databases.

Some users have found that Notes data integration tools do more than move data back and forth.

Bob Chin, director of group systems at The Prudential Insurance Company of America in Roselle, N.J., uses Trinzic's InfoPump to link Notes mail and client/server applications.

Prudential's applications utilize a mainframe gateway, which tends to be unstable, so InfoPump is programmed to monitor the gateway about every 5 minutes.

"InfoPump detects possible data integrity problems in our database and notifies people via Notes," Chin said.

Down the road, Chin said the company will begin moving data via InfoPump among Notes, as well as both its production mainframe systems and five Sybase, Inc. SQL Server databases. Before that happens, however, the company needs to carefully evaluate the way its Notes server is configured, he said.

"Our Notes infrastructure has both development and production servers on the same box. While playing with moving data back and forth, we once inadvertently shipped a report on a 50,000-row database to everyone with Notes," he said.

A low-cost alternative

While middleware offerings such as InfoPump are powerful, some users have opted for a lower cost alternative.

Graham Acres, a consultant for British Columbia Tele Systems Solutions, the MIS division of British Columbia Telecom in Burnaby, B.C., has stored mainframe-based project data and information stored in a legacy accounting system in the more Notes-friendly Microsoft Access database. From there, Acres used Brainstorm's DataLink to move data from Access to Notes, where analysts can determine MIS project costs.

Acres chose DataLink over InfoPump even though InfoPump would have given the company direct access to the mainframe data from Notes. "Accessing the data directly was hard and you couldn't always navigate the way you wanted to," Acres said. In addition, Brainstorm's offering only costs about a fifth of Trinzic's, he said.

On the way

Users will likely have an even wider selection of Notes data integration tools from which to pick in coming months, Patricia Seybold's Marshak said. IBM and Lotus are sure to work toward tighter integration between Notes and relational databases, workflow systems and imaging systems, he added.

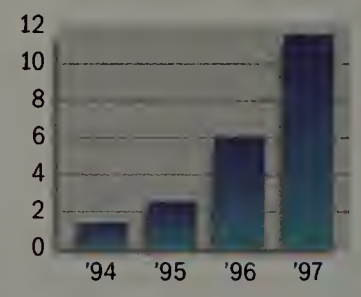
Relational database vendors themselves, including Oracle and Sybase, are also readying links between their database replication systems and Notes. ■

MAKING THE NOTES-DATABASE CONNECTION

Product	Function	Pricing
Brainstorm Technologies' DataLink	Migrates data between Notes databases and relational systems.	$3,995 for the server software; client software costs $495 for a limited edition and $1,495 for the standard edition
Casahl Technology's Replic-Action	Replicates data between Notes, and relational and legacy databases.	$1,500 for the development version; $10,000 for the production version
Information Builders' EDA/SQL Copy Manager for Notes	Accesses more than 60 data sources from Notes.	$5,000, plus a $5,000 consulting fee (recommended); requires an EDA/SQL server
Percussion Software's Notrix Composer	Replicates data between Notes databases as well as with ODBC-compliant data sources.	$2,500
Trinzic's InfoPump	Transfers data among one or more data sources, including Notes, with little coding.	Starts at $25,000

EXPECT A NOTABLE INCREASE

Notes user installed base
(In millions of users)



IBM's acquisition of Lotus could help the Cambridge, Mass., software vendor add at least 4.5 million more Notes users during 1996 and 1997 than it would have as a stand-alone company, according to the Yankee Group, a Boston-based consultancy.

What Lotus itself provides

Lotus Development Corp. plans to boost the built-in capabilities for moving data between Notes and other data sources when it ships Release 4 of Notes later this year.

"Two major goals of Release 4 are to improve programmability and database integration," said Alex Neihaus, senior marketing manager at Lotus.

Both goals will be accomplished with the addition of an object-oriented programming language called LotusScript, Niehaus said. Developers will be able to use LotusScript to access relational databases and other non-Notes data sources via Open Database Connectivity technology, he said.

Notes clients can currently pass data to other data sources via Dynamic Data Exchange, OLE or Notes' Forward/Field Exchange, while data stored on Notes servers is accessible from non-Notes applications via APIs.

"This level of programming gives you the maximum level of control and also requires the most work," Neihaus said.

In Release 4, Lotus will improve the commands within the Notes client macro language that allow developers to look up database data and column values as well as pass commands from a Notes client to a database server. The commands will no longer be limited to read-only access or 64K bytes of data, Neihaus said.

Despite the expected improvements, analysts said there will still be high demand for third-party data integration tools for Notes.

"Notes Release 4 will have a lot of enhancements, but it's not a breakthrough in Notes integration," according to David Marshak, vice president and senior consultant at Patricia Seybold Group, Inc. in Boston.

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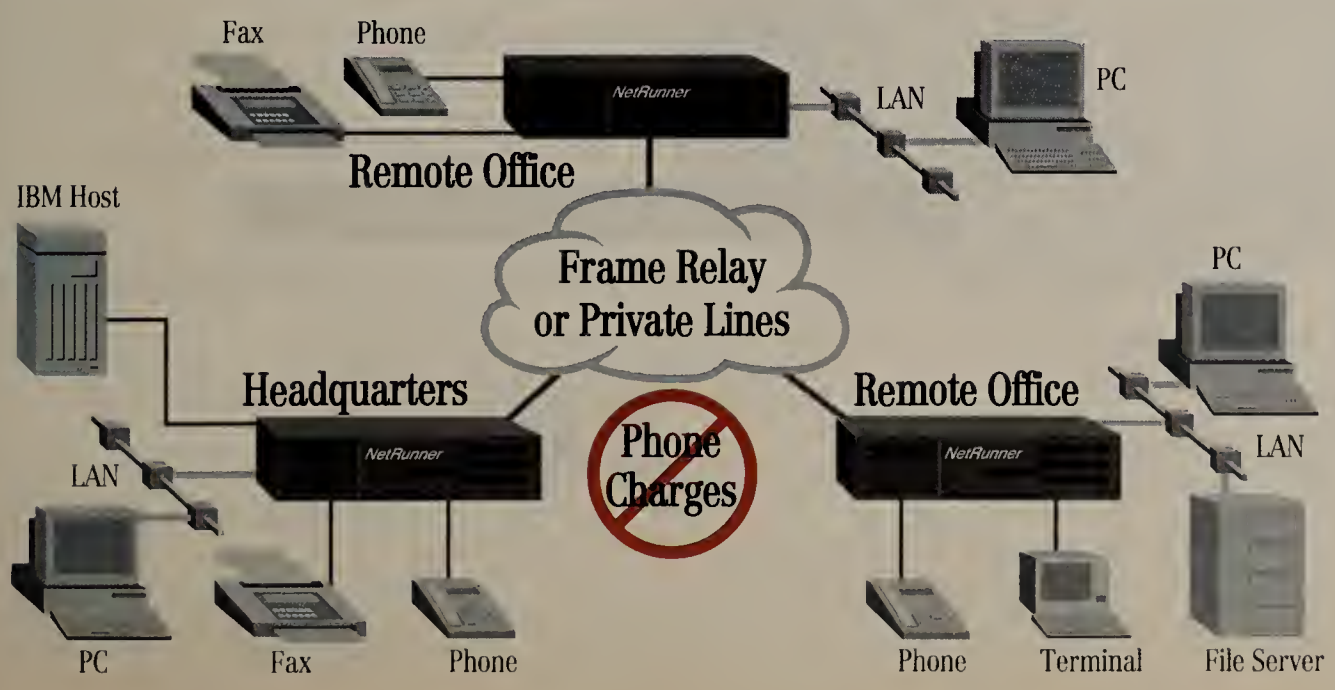
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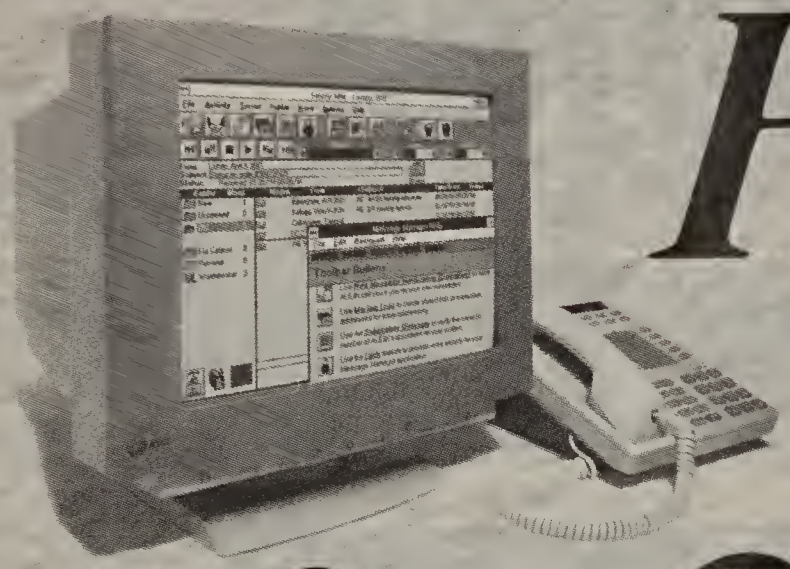
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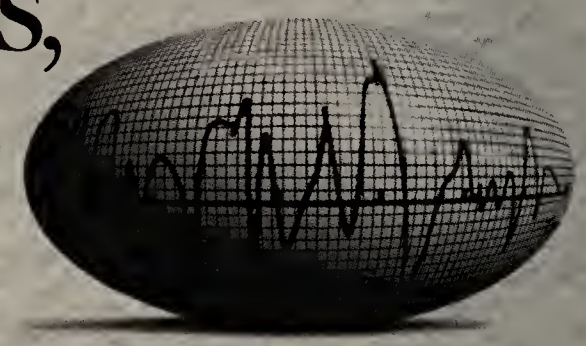
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NETWORK WORLD

A SUPPLEMENT

COLLABORATION

WHERE GROUPWARE MEETS DISTRIBUTED COMPUTING

SEPTEMBER/OCTOBER 1995

THE WEB: NOTES FRIEND OR FOE

Some people assume Web technology can do everything Notes can. Tommyrot, says John Landry, Vice President of Lotus' Advanced Technologies Group. While he admits the Web will fulfill the low-end needs of some users, most of them will turn to Notes as their needs become more sophisticated. Notes also makes a hell of a good Web management tool, he says.

See story page 22.



Notes is indeed a profound solution, but it may be overkill for some applications. Do you want a corporate information distribution tool that is simple to implement, comes ready-to-run, supports multimedia, is based on standards, runs on multiple platforms and is extensible? Building a private Web may be the way to go.

See story page 27.



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The Web a threat to Lotus Notes?

John Landry, vice president of Lotus Development Corp.'s advanced technologies group, says it's a matter of expectations. If the world did not expect anything more from a car than the Yugo delivered, then the arrival of those little tin boxes would have been a threat to everyone from Chevrolet to Porsche.

Well, ok.

But unlike the Yugo, the Web appears to fit a hot need; demand is exploding. And in sheer numbers, there are more mid- to low-end users than high-end shops.

So instead of brushing those Yugo segments aside, wouldn't it have made more sense for Lotus to broaden the reach of Notes and try to bring more prospective customers into the fold? After all, GM doesn't stop with Chevys. It offers everything from Cadillacs to Prizms.

To its credit, Lotus has been responding to the market by lowering its prices and offering lighter weight Notes clients, but many critics say it is too little too late. In the interim, the Web arrived, as well as a host of other low-end tools from competitors.

None of these will unseat Notes, the granddaddy of collaboration tools. The products and technologies will mature with the market and the knowledge of users until a symbiotic balance is found.

In the end, it is probably better for us all that Lotus was not fleet enough of foot to corner a bigger piece of the market.

John Dix

jdix@nww.com

STAFF

Editor John Dix
Managing Editor Beth Schultz
Art Director Rob Stave
Designers Lainey Rabinow
Susan Slater

Network World Editor John Gallant
Publisher Colin Ungaro
Production Director Ann Finn

Network World, Inc., 161 Worcester Rd.
Framingham, MA 01701
Phone (508) 875-6400, Fax (508) 820-3467

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The Web: Notes friend or foe?
By John Dix
John Landry, vice president of Lotus Development Corp.'s advanced technologies group, says he spends 80% of his time thinking about the World-Wide Web. And well he should. At some levels, Web technology represents a real threat to Lotus Notes.



Private Webs: The inside story.
By Mark Gibbs
Notes is a profound solution, but maybe overkill for some applications. Turn to the Web for an information distribution tool that is simple to implement, comes ready-to-run, supports multimedia, is based on standards and is extensible.

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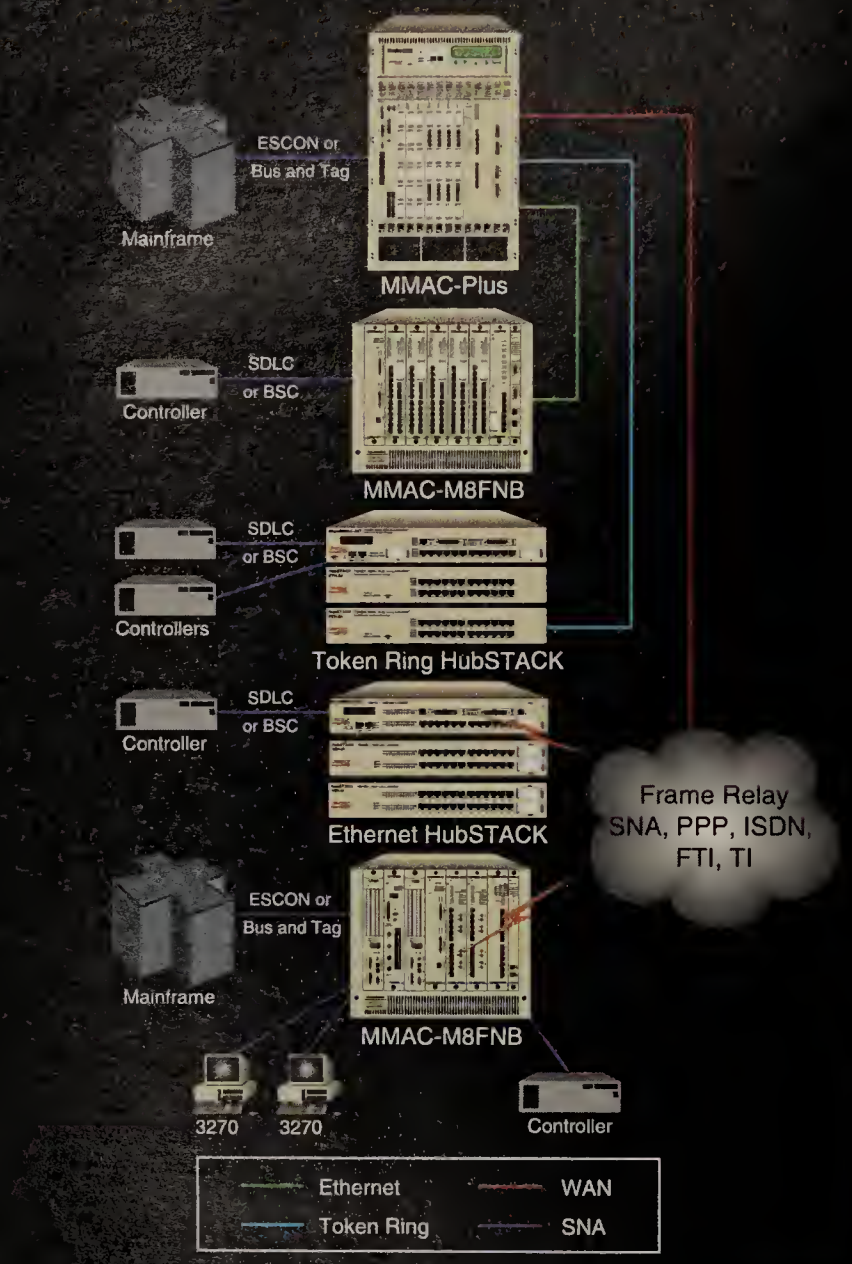
DEPARTMENTS

5 Sum of the parts
Survey shows what road warriors typically access from the road; Internet tool lets you look before you leap; Codifying workflow; Personal groupware -- oxymoron or team enabler.

38 Collaboratus
IBM's acquisition of Lotus Development Corp. looks to be a good thing. But there is one big question: can the companies align the egos, personalities and cultures to make this a success?

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SUM OF THE PARTS

Tips and tidbits about collaboration products, issues and trends

That wily workflow

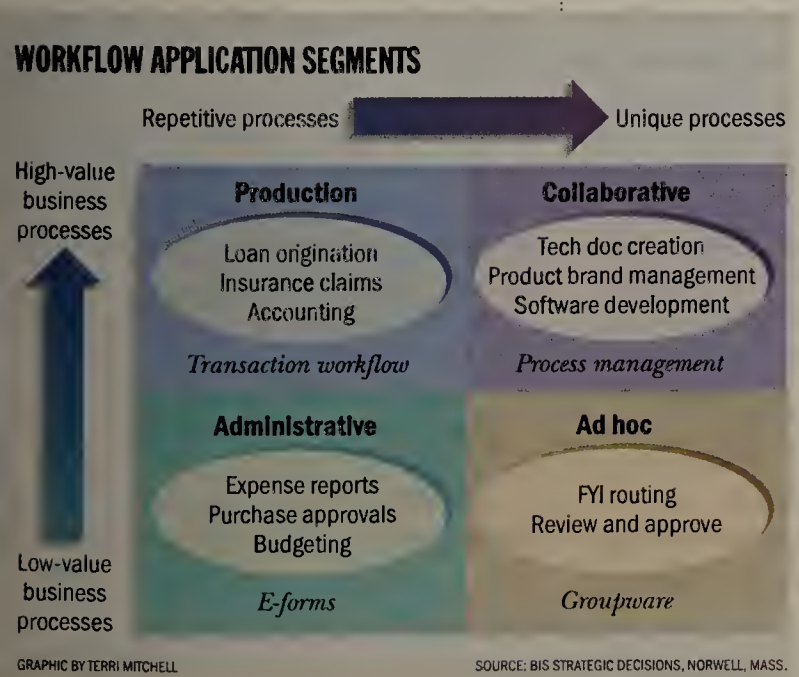
Having trouble getting your hands around workflow products?

Research firm BIS Strategic Decisions in Norwell, Mass., offers a handy matrix that can be used to sort and order tools as you come across them. The cells of the matrix include:

•Production Workflow — dealing with transaction-oriented, high-value repetitive processes such as insurance claims.

•Collaborative Workflow — dealing with high-value, nonrepetitive, generally non-transaction-oriented processes such as sales force automation.

•Administrative/Ad Hoc Workflow — dealing with low-value processes generally connected to routine office work, such as travel expense reporting or budgeting. Ad Hoc products are often E-mail based and involve review and approval actions, for example.

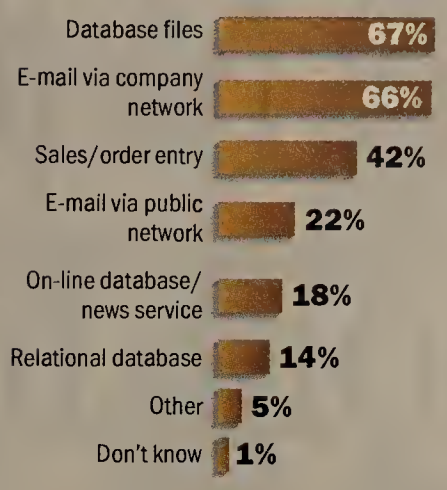


Getting to corporate resources

Survey results show what road warriors depend on most

Many workers on the go want to remain in the know about what is going on at corporate headquarters, so they tap into the company network using wireline or wireless services.

In a recent survey of 300 companies, The Business Research Group (BRG) found that 55% of mobile workers use their portable computers to communicate with corporate networks. Electronic mail and shared databases are the most commonly accessed applications, says Rebecca Diercks, program director of wireless research at BRG, of Newton, Mass.



The overwhelming majority, or 93%, of those mobile workers tap into the corporate computers or networks via a wired modem connection. A minuscule 3% send data wirelessly, according to the report, called "Untethering the Mobile Worker: Projecting Demand for Advanced Wireless Services."

As use of wireless services gradually picks up, workers will become more productive, Diercks says. They will be able to send E-mail messages, check database files or update information wherever they are, rather than waiting until they return to their hotel rooms at the end of the day, she says.

BRG found that within two years, 13% of mobile workers who need remote access to corporate resources will use wireless data communications. This represents a compound annual growth rate of 255%.

A dramatic increase in the use of wireless services will be spurred by lower prices brought on by more competition, more widespread availability of wireless nets and a greater variety of services, Diercks says.

Adding the personal touch

"Personal groupware." The phrase may sound like an oxymoron, but HyperDesk Corp. has coined it to describe a new breed of team software it offers.

HyperDesk's philosophy is that a team's needs are best supported by focusing on the individual. Teams must be able to organize information by specific project, and individuals must be able to organize their work within the project the way they choose and according to their own personal work styles, the Westborough, Mass.-based company says.

The company's philosophy is interesting, says Rochelle Theophano, senior analyst at Datapro Information Services Group, of Delran, N.J. "This is the first groupware product I've seen that is based around project management. It's a good fit," she says.

HyperDesk's software, called GroupWorks, lets users build ad hoc teams around projects, and instantly share, coordinate and track schedules, discussions, contacts and documents associated with the activity. And while they are collaborating via GroupWorks, team members can keep their own preferred applications and work methods.

To accommodate such flexibility, HyperDesk has based the software on the industry's object standard, Microsoft Corp.'s Object Linking and Embedding (OLE) technology.

Because GroupWorks centers on distributed object management, users of the software can attach documents developed in different applications to the project and share them with all team members, regardless of file location. In addition, team members can view and annotate a document, even if they do not have the applications that created the documents on their personal computers.

Theophano says GroupWorks is worth checking out, particularly since companies can do so rather cheaply. Through September, HyperDesk is offering GroupWorks at $199 for a single-user license, $495 for a three-user license and $1,680 for a workgroup (up to 15 users) license. After that, the software will sell for $299, $695 and $2,250, respectively.

"GroupWorks could allow people to work in teams for a cheaper cost per seat, and if the software doesn't meet a company's needs, it can move to a higher end product," she says.



Look before you leap

If you're getting tired of what some now call the World Wide Wait, Frontier Technologies Corp. has a tool for you. SuperHighway Access CyberSearch combines Frontier's Web browser with a CD-ROM-based version of Carnegie-Mellon University's Lycos database listing more than 500,000 Internet pages indexed by key word.

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The product costs $14.95. Subsequent Lycos CD updates cost $9.95; a subscription of six bimonthly updates is available for $58.50. Call (414) 571-0190 to order.

Like Notes, but a whole lot easier

BY JOANNE CUMMINGS



Mesa's Conference+ runs within the Microsoft MS Mail environment, meaning you don't have to install more apparatus.

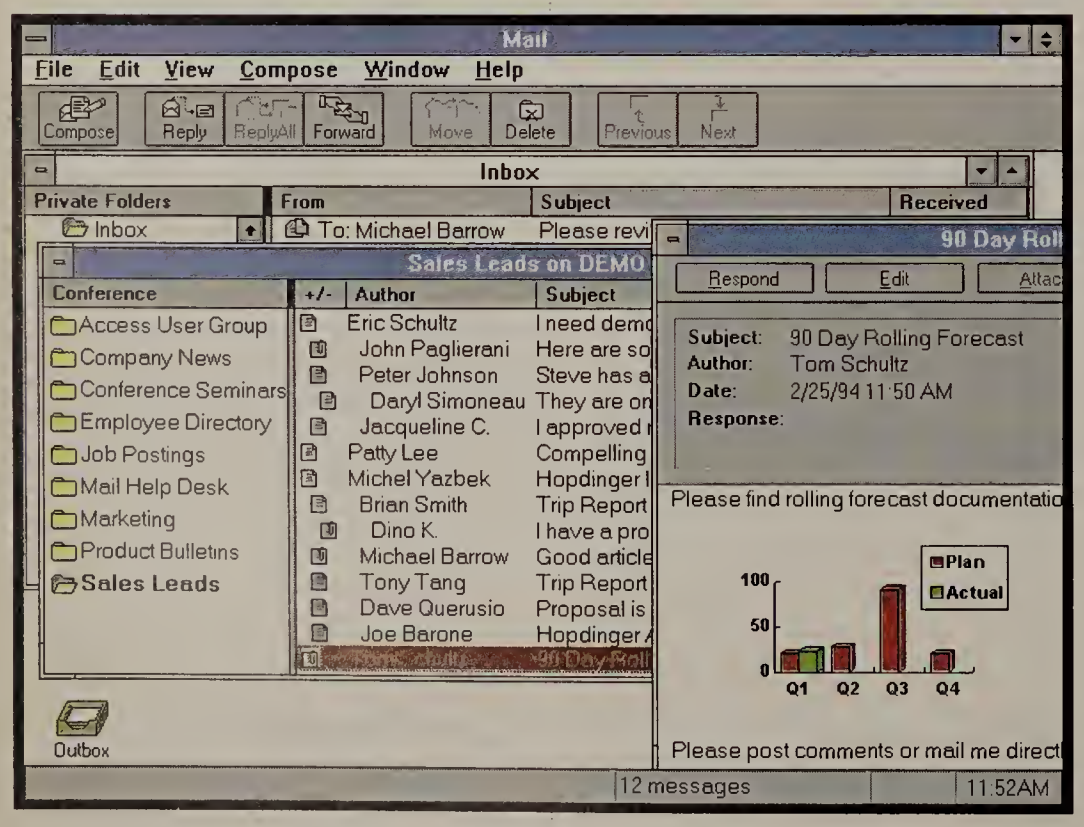
TOOLS FOR TEAMS

OK, so you want the strategic information sharing advantages of Lotus Development Corp.'s Notes but you don't want the hassle of installing and administering Notes servers.

If you already have a Microsoft Corp. Microsoft Mail network in place, The Mesa Group's Conference+ could be the answer to your groupware prayers.

According to Ben Shelton, director of marketing at Newton, Mass.-based Mesa, Conference+ offers the groupware functionality of Notes and the simplicity of Microsoft Mail.

"It all runs within the MS Mail environment," says Shelton, a former Notes product manager. "You don't have to install the client/server apparatus Notes requires, and there's no learning curve. All the functionality is available within the same user interface as MS Mail. It just appears as additional folders and menu items within the MS Mail client."



Tracking sales leads *with Mesa's tool*

According to Shelton, many users are interested in Notes functionality but balk at the administrative burden.

"Notes is really a departmental product," he says. "You rarely see it deployed across an entire organization, and that's because of its lack of scalability. It's difficult to manage."

Shelton adds that typical Notes databases require one administrator per database. "That's a lot of extra manpower, especially if you're looking to support environments with 5,000 or 10,000 people," he says. "It's just not feasible."

Conference+ is designed to leverage the existing infrastructure. Because it resides inside Microsoft Mail, it obviates the need for an additional server or administrator. In addition, because it is so tightly linked with Microsoft Mail, it utilizes the mail system's Global Address Book and distribution lists, further alleviating administrative tasks. It's also less expensive, costing about $33 per user, vs. Notes at about $275 per user.

Like Notes, Conference+ provides the ability to build discussion data bases to share information across a corporation. Users post information to conference folders, which are actually MAPI 1.0-based object stores residing on each mail server.

When users update information in one conference folder, Conference+ automatically replicates the changes to the corresponding folders on other mail servers, using the messaging transport in place. Users then see the updates and additions to conference conversations the next time they call up the conference folder. They can follow conversation threads and brainstorm on projects as if they were simply sending and receiving E-mail.

The product also lets users build customized applications using such programming tools as Microsoft's Visual Basic.

The overall result is the ability to efficiently disseminate and share information across the enterprise.

"It really minimizes mail traffic," says Mary Ann Tallman, manager of E-mail at Allied Signal, Inc., a manufacturing company in Tempe, Ariz. "Before we installed Conference+, if someone wanted to send information across the company, they might send a broadcast message to 20,000 people, which would flood the network with unnecessary traffic. Now they just post it to 20 post office servers and everyone just checks the conferences daily."

Tallman installed the product on the company's 30,000-seat Microsoft Mail network last fall and has it up and running on 1,000 user desktops. She says it is used primarily for discussion databases and information sharing, although it will probably be expanded when it gets rolled out to more of the users.

"We really like the fact that it's not a stand-alone product, so we can use it and still stay within our existing strategies," she says. "We also like that it will coexist with Microsoft's Exchange."

According to Shelton, because Conference+ is MAPI 1.0-based, it is the only product that is compatible with Exchange, Microsoft's upcoming groupware product.

In fact, Conference+ comes bundled with Microsoft Mail in North America and Latin America.

That's not to say Mesa sees itself supplanting Notes. "We don't see Notes as a 100% competitor," Shelton says. "But when an MS Mail enterprise is evaluating Notes, we can offer a cost-effective alternative." ■

Cummings is a freelance writer in Marlborough, Mass.

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Team spirit without the team

Knowledge bases make it possible to capture a teams' knowledge and make it available to individuals. Call them off-line collaboration tools.



LISA MANNING

BY LINDA MUSTHALER

If two heads are better than one for solving a problem, imagine what happens when many minds are applied to a dilemma.

That's the premise behind a knowledge base, a collection of empirical information that can be used to diagnose and resolve problems. With a knowledge base, the experiences of many individual minds are captured and stored, giving the group a collective wisdom.

Although group members may not collaborate in real time, they build upon one another's experiences, eliminating the need to start from ground zero each time a seemingly new situation arises.



JERRY KALYNIUK

Joanna Batchelor, *executive director of the Mayor's Action Center in Indianapolis, relies on a knowledge base to empower employees.*

Help desk and customer service organizations are natural homes for knowledge bases. Besides enabling these organizations to respond more quickly to customer needs, they also provide fairly standard responses to situations based on the latest information available.

Perhaps best of all, though, is the opportunity to share the knowledge of experts among many people, especially novices who may know little about the subject matter. Thus, a service organization can use much less experienced (and less expensive) people to staff the hot line without losing the ability to serve the customer well.

Think of knowledge bases as off-line collaboration tools.

Tools of the Trade

Don't, however, go browsing the aisles of your favorite computer superstore looking for knowledge base wares. Knowledge bases are not off-the-shelf products. They are really custom databases.

Knowledge bases typically have two components: the knowledge itself, which often takes the form of unstructured text, and the database application that allows you to store and query the information. Ob viously, the knowledge is as unique as your team's collective experiences and is the real value of a knowledge base. The database structure is more of a holding pen for your information.

You could use any common database product to create the structure for your knowledge base. However, most database products limit the way you can link and query the data. You'll find it's much more effective to use one of the commercial knowledge base products specifically designed for the complex relation ships of unstructured information.

Inference Corp.'s CBR Express is one of the most popular authoring tools for creating a knowledge base structure. With CBR Express, you can start from scratch to build your own format and screens that display the prompts and clues for providing detailed information and problem resolutions.

An alternative is to use a commercial customer service product that already defines the database structure. Among the products in this category are Expert Advisor from Software Artistry, Inc., Apriori GT from Answer Systems, Inc., The Vantive System from Vantive Corp., Customer-One from BateTech Software, Inc., and Top of Mind Help Desk for Windows from The Molloy Group.

Your customized knowledge base application can also be integrated with other systems such as workflow, fax back systems, automated call distributors, document management or even network management. Interfaces to these systems often require the services of an experienced systems integrator.



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Getting to Know You

There are two important aspects to every knowledge base: getting knowledge in and getting useful information out. How you plan to get information out makes a huge difference in how you should put it in. The key is to be able to hone in on the right information in as few steps as possible, and technology plays a big role here.

There are several diagnostic technologies that vendors of help desk or customer service tools, for example, embed in their products. Among them are decision trees, key word searches, full-text searches, case-based reasoning and neural networks.

Some vendors offer unique technology, such as "bubble up" from Answer Systems, which filters common problem/resolution pairings to the top of the knowledge base, saving people time as they hunt for information. By far, the most commonly deployed retrieval technologies are key word searches and decision trees.

Another emerging technology that vendors are embedding into knowledge base software is adaptive learning, which enables a natural language query of the database. Adaptive learning is helpful for problems that can be expressed in a variety of ways because the system learns about related concepts and word derivations.

As the problem description text is entered, the system grabs key words out of that text and matches them to a library of problem and resolution pairings. The system then returns a rank-ordered list of potential resolutions.

For instance, a help desk might field a problem about a printer that leaves black streaks on a page. The key words might be printer and streaks. The system will search for synonyms and derivations of those words, as well as search for those contents paired together in a database of previously solved problems. This type of technology frees the user or customer service representative from having to figure out the right way to express a problem.

Loading the Base

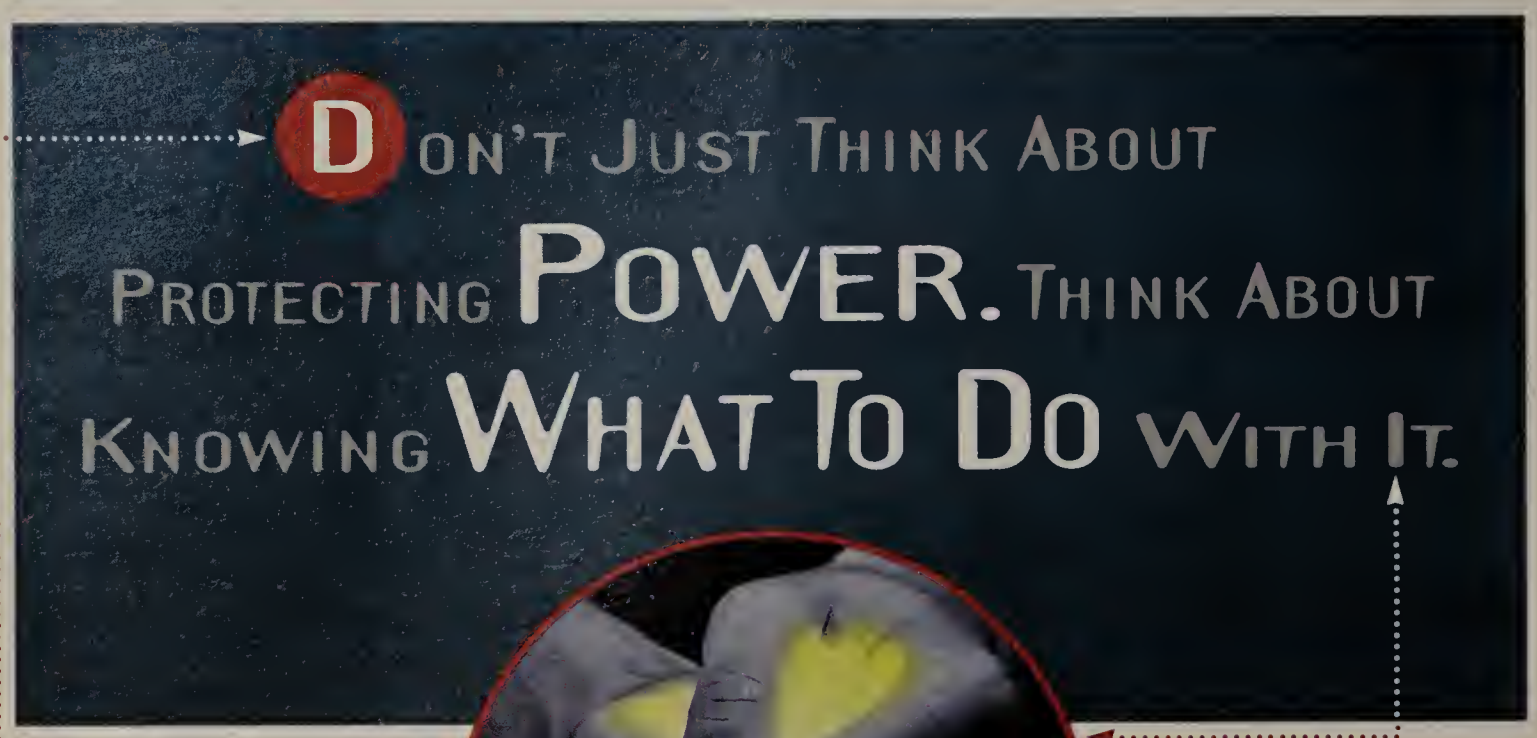
Once you understand how you plan to retrieve information, it's time to put the data in the database. Front-loading the knowledge base with everybody's knowledge can be quite time-consuming, but it is a critical step for deploying an effective system.

Mapping out the way information is connected requires a serious commitment of resources, often for weeks or months at a time. However, a well-planned knowledge base can be worth its weight in gold.

In mapping the information, a subject matter expert explores the possible causes of possible problems and the steps to take to diagnose and resolve the case. In a decision tree-type database, the designer comes up with "if, then, else" scenarios to drill down to the most likely solution.

For example, a help desk case might be, "My printer doesn't work." And the diagnostics might be something like this: Ask if the printer is turned on. If no, then turn it on. If yes, then ask if the printer is on-line, and so on. The diagnostic procedure might include several questions that get more specific as you work through the problem.

A shortcut to front-loading a knowledge base is to use canned information. Several vendors sell prepackaged knowledge bases for help desk subjects, such as commercial products like Lotus Development Corp.'s Lotus 1-2-3 and Novell, Inc.'s NetWare. Prepackaged knowledge is simply not available, however, for customer service applications, where problems and resolutions are as individual as your customers and products or services.



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Racing to Respond

One group that has found a unique use for a knowledge base is the Mayor's Action Center in Indianapolis. Joanna Batchelor is the executive director of the center, which serves the needs of both the city of Indianapolis and the surrounding communities of Marion County. Batchelor's team performs a customer service function for the citizens of the greater metropolitan area, who call the center for a variety of reasons.

The Action Center is designed to provide one-stop shopping for residents. Citizens can call the center to ask questions about any city or county service or event, to log complaints or to request a service. Calls range from questions about trash pickup schedules to requests to remove abandoned vehicles.

Ten customer service representatives (CSR) field the calls and identify which government department needs to act upon them. Three facilitators provide second-level support, handling some of the more unusual cases and conducting research as necessary. Beyond this central number are all the government agencies that provide the actual services.

The CSRs use Software Artistry's Expert Advisor customer service software and knowledge base technology to log incoming calls, diagnose the calls to provide a recommended resolution and send a service request, if necessary, to one of the operations departments.

For example, a local resident might call to request that a pothole be filled. The CSR enters a basic description of the reason for the call into a database, and the knowledge base prompts for more information: "Where is the pothole located?"

After the CSR enters the location or address, the knowledge base interfaces with a geographical database that determines which municipality or operations group has jurisdiction. The system might prompt for more information or return a recommendation on how to resolve the situation.

In this case, the agency responsible for road repair of that specific street is notified about the pothole. The CSR tells the caller that help is on the way. Meanwhile, the CSR can automatically initiate a request for service from the public works organization, either via fax or file transfer.

Prior to installing the knowledge base, all of the Action Center's pertinent data was kept in unwieldy 3-in. binders. "If someone wanted to know about a specific service, we had to look it up in an indexed set of books," Batchelor says. "Even though the subjects were alphabetized and cross-referenced, it still took too much time to find the information. The real problem, though, is that the binders were an updating nightmare. And we sometimes had trouble getting the word out about time-sensitive news."

The knowledge base resolved both the updating issue and the problem of distributing hot news or short-duration information. A non technical system administrator is the focal point for all updates to the knowledge base. She checks the integrity of the information and then adds or updates the information, which then becomes instantly available to all users.

No matter how you load, slice and dice the group's collective wisdom, a knowledge base can help your team quickly get to the root of a problem, and subsequently, to the resolution. Two (and more) heads really are better than one. ■

Musthaler is vice president of research at Currid & Co., a Houston information technology consulting firm.

She can be reached at musthaler@ngw-gate@mhs.compuserve.com or (713) 789-5995.



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PHOTO BY JOHN RAE

Stash Jarocki, *a vice president of IS in Citibank's Corporate Audit Group, says translating between vendor directories will be a nightmare.*

Implementing integrated directory, naming, security and administration services to enhance collaboration.

BY ELISABETH HORWITT

When GTE Telephone Operations comparison shopped for an enterprise messaging system recently, ease of management was a crucial criterion and a major reason why the unit ended up choosing Banyan Systems, Inc.'s BeyondMail.

An internal evaluation found the product to be "approximately two times less expensive to administer than any of the leading LAN-based messaging systems," says Trudy Heatherly, the unit's director of electronic messaging and directory services.

The primary factor contributing to BeyondMail's management prowess, Heatherly says, is its strong integration with Banyan's StreetTalk, which the GTE unit recently adopted as its enterprise directory service.

Also contributing to the decision is the fact that Banyan is delivering a rules-based messaging system using client/server technology now, whereas the others are only promising this in future releases, Heatherly says. This enables support functions to be performed from a centralized location, she adds.

Through StreetTalk, and Banyan's overall Enterprise Network Services (ENS) platform, GTE Telephone plans to centrally manage and maintain a nationwide network that supports some 31,000 LAN users accessing messaging, database, and file- and print-sharing servers, Heatherly says. "This is an absolute requirement for us."

ENS is one of a growing number of integrated directory, naming, security and administration services that can be used to manage and coordinate user access to various collaborative applications, information resources and network services across the enterprise. Novell, Inc's NetWare 4.1 and NetWare Directory Services represent another such platform. IBM/Lotus Development Corp. and Microsoft Corp. are promising similar offerings in the next year or two.

Like GTE, a growing number of corporations are getting serious about implementing these tools to enhance corporate collaboration. Or they are at least providing single user logon and administration across various groupware applications and back-end services to ease information sharing and systems management.

For example, a global directory —or failing that, synchronized and centrally administered multiple directories — could spur collaboration by simplifying discovery and use of servers that are hard to find and require separate logon routines, says Andy Roehr, technical director of BSG, a Houston-based systems integrator.

Finding resources is becoming harder as corporations move from stovepipe organizational structures to interdepartmental, team-based environments, and it's even more difficult between corporations in a virtual enterprise, Roehr adds.

Global directory and naming tools can also simplify the onerous job of mapping network users and resources to physical locations and keeping track of moves, adds and changes. This is critical to most collaborative applications, such as workflow tools.

"All workflow is dependent on main-

taining a physical/logical connection," says George Reid, senior technology analyst for Sanford C. Bernstein & Co., a New York-based investment firm. "When someone changes jobs, their physical hardware and location may not change, but their logical connections [to various information resources] might. Conversely, if someone moves from one office to another, you want to be able to change the physical location but maintain all the logical connections."

Directories and other tools are also central for mail and groupware. "One of the dings of having an enterprise system like Notes or cc:Mail is that people hate the fact that when you add a user, you have to do it in six different places today," Roehr says.

Piece by Piece

According to Reid, the best approach is to "build an object-oriented base infrastructure, centrally managed by IS and common to everyone." Without such an infrastructure, systems such as Notes are "difficult to maintain because you have to go back and find all the places you have to change stuff" in the routing tables of various Notes servers.

Despite the undeniably attractive benefits of enterprise directories, most corporations are taking a cautious, piece-by-piece approach to choosing and implementing such structures, says David Passmore, president of Decisis, Inc., a Herndon, Va., consultancy.

One reason is the directory tools are, for the most part, still young, with at least two major players — IBM and Microsoft -- still waiting in the wings. Prior to the acquisition of Lotus, IBM's groupware division was promising an enterprise directory and naming structure that would provide both X.500 compliance and object technology based on IBM's Distributed Systems Object Model. IBM has yet to elaborate on how such a strategy would pertain to Lotus Notes and cc:Mail, now that Workgroup is officially dead.

Microsoft has promised an object-oriented directory in Cairo, a new version of Windows NT due out in late 1996.

"Microsoft will force people to reshuffle the deck when it brings out Win 95 and then Cairo, and provides the same type of capabilities everyone else is talking about," says Reid, whose firm is a major Microsoft shop. "You'll see a lot of Notes installations tossed out if Lotus doesn't make Notes more manageable."

Some of the challenges to implementing directory and other tools on an enterprise basis are organizational and political, analysts say.

Right now, three communities — NOS, messaging/groupware and object-oriented application developers — are "working independently to institute a directory service," Passmore says.

Some companies will stop right there. At US WEST Inc., for example, "Messaging is pretty distinct from any of the groups that handle NOS stuff," says Steve Dickson, a messaging network manager for the regional Bell holding company. Integrating the two groups' infrastructures is unlikely to take place in the foreseeable future, he adds.

Proprietary or Standard

For companies that want to go a step further and provide single sign-on and administration across Network Operating System, groupware and messaging services, one big dilemma is whether to go proprietary or standards-based.

Going with a proprietary infrastructure such as NetWare 4.1 is particularly tempting to corporations such as Citibank and Chase Manhattan, which are already major Novell shops and



have begun rolling out NDS services on the NOS side.

"We're focusing on NDS as our core strategy," says Myles Trachtenburg, vice president and manager of distributed technologies for Chase Manhattan.

One major advance promised by Novell, Microsoft and Banyan over the next few years is expanded directory and naming services that will be able to track a wider range of network objects. An object-oriented directory with special fields would enable a user or a client application to request: not just the nearest printer, but the nearest unoccupied color printer; not just specific employee names, but all employees with a particular job title in a particular building; and not just a database server, but a particular file on that server, vendor spokesmen say.

The above vendors are also talking about marrying their extended naming services to object request brokers (ORB) and products such as Microsoft's OLE and Apple Computer, Inc.'s OpenDoc. This will enable users to create dynamic links that automatically download to the desktop whatever information objects are needed to do their work, such as status reports on projects, messages from team members, updated files relating to their work, or relevant material from news services and Internet forums.

While few corporations are panting for such capabilities now, they will become important when users start extending their OLE and OpenDoc installations beyond a single desktop and begin creating dynamic links to applications and objects on remote systems, Passmore says. At that point, companies will start needing a directory linked to an ORB to track those "objects playing across the network."

"Microsoft will have its object-oriented directory in Cairo, and Novell will have NDS, and Banyan has StreetTalk, and translating between them will be a nightmare."

One major advantage of NetWare 4.1, and ENS in particular, is that they are proven global directory and naming services, with strong administrative functionality, users and analysts say.

And like it or not, the vendors are apparently determined to add proprietary value to their infrastructures.

The vendors' aggressive plans for proprietary value-added features are worrying users such as Stash Jarocki, a vice president of IS in Citibank's Corporate Audit Group. "Microsoft will have its object-oriented directory in Cairo, and Novell will have NDS, and Banyan has StreetTalk, and translating between them will be a nightmare. Will everyone adhere to X.500? I suspect not; all will want uniqueness, so then you'll need someone to put all these nice little bridges in the middle."

Further muddying the waters is Microsoft's recent announcement of its Open Directory Services Interface (ODSI), a set of APIs that promise to enable Windows and NT client applications to access different directories in a consistent fashion. ODSI is also said to provide consistent APIs for managing and synchronizing updates across multivendor directories -- in effect, challenging X.500 as a de facto standard. Both Novell and Banyan have indicated that they will support ODSI.

Corporations such as Citibank are heavily invested in standards such as X.500 and the Open Software

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21. ☐ Other *(please specify)* _____

2 What is your job function? (check one only)

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2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
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7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)* _____

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)
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2. ☐ Approve
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4. ☐ Determine the need
5. ☐ None

5 Check ALL that apply in Columns A and B:

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☐ 17.	☐	Remote LAN Access/Communications Servers
☐ 18.	☐	Superservers
☐ 19.	☐	File/Application Servers
☐ 20.	☐	Print Servers
❑ 101	❑	**INTERNETWORKING**
☐ 21.	☐	Bridges
☐ 22.	☐	Routers
☐ 23.	☐	Bridge/Router
☐ 24.	☐	Gateways
☐ 25.	☐	Intelligent Hubs/Stackables
❑ 102	❑	**COMPUTERS/PERIPHERALS**
☐ 26.	☐	Laptops/Notebooks/Sub-Notebooks
☐ 27.	☐	Micros/PCs
☐ 28.	☐	Minis
☐ 29.	☐	Mainframes
☐ 30.	☐	Workstations
☐ 31.	☐	Terminals
☐ 32.	☐	Printers
☐ 33.	☐	Cluster Controllers
☐ 34.	☐	Monitors
☐ 35.	☐	Fax/Modem Boards
❑ 103	❑	**REMOTE/WIRELESS COMPUTING**
☐ 36.	☐	PDAs
☐ 37.	☐	PCMCIA Devices
☐ 38.	☐	Wireless Data Services
☐ 39.	☐	Wireless Data Equipment
☐ 40.	☐	Wireless LANs
☐ 41.	☐	Cellular Equipment & Services
❑ 104	❑	**INTERNET/ELECTRONIC COMMERCE**
☐ 42.	☐	Internet Access Providers
☐ 43.	☐	Firewalls
☐ 44.	☐	Web Servers/Browsers
☐ 45.	☐	Internet Software Tools
❑ 105	❑	**SOFTWARE/APPLICATIONS**
☐ 46.	☐	Network Management
☐ 47.	☐	Systems Management
☐ 48.	☐	Security
☐ 49.	☐	Communications Software
☐ 50.	☐	Terminal Emulation
☐ 51.	☐	Word Processing
☐ 52.	☐	Operating Systems
☐ 53.	☐	Client/Server Applications Development
☐ 54.	☐	Database Management/RDBMS
☐ 55.	☐	Spreadsheet
☐ 56.	☐	Groupware
☐ 57.	☐	EDI
☐ 58.	☐	E-mail
☐ 59.	☐	Windows/Graphical User Interface
☐ 60.	☐	Multimedia
☐ 61.	☐	Graphics/DTP
☐ 62.	☐	Remote Access
☐ 63.	☐	Imaging
☐ 64.	☐	Suites
☐ 65.	☐	Middleware
☐ 66.	☐	Document Management
☐ 67.	☐	Database Server
☐ 68.	☐	Site Metering Tools
☐ 69.	☐	Computer-Integrated Telephony (CIT)
❑ 106	❑	**WIDE-AREA NETWORK EQUIPMENT & SERVICES**
☐ 70.	☐	Frame Relay Equip./Services
☐ 71.	☐	Modems
☐ 72.	☐	FT-1/T-1/T-3 Multiplexers
☐ 73.	☐	FT-1/T-1/T-3 Services
☐ 74.	☐	SONET
☐ 75.	☐	Inverse Multiplexers
☐ 76.	☐	SMDS
☐ 77.	☐	Asynchronous Transfer Mode
☐ 78.	☐	Diagnostic/Test Equipment
☐ 79.	☐	DSU/CSU
☐ 80.	☐	VSAT/Satellite
☐ 81.	☐	ISDN Equipment & Services
☐ 82.	☐	PBXs
☐ 83.	☐	Voice Mail/Response
☐ 84.	☐	Videoconferencing
☐ 85.	☐	Leased Lines
☐ 86.	☐	Switched Data
☐ 87.	☐	E-mail/On-line Services
☐ 88.	☐	800/900/MTS Services
☐ 89.	☐	Virtual Networks
☐ 90.	☐	Outsourcing/Systems Integration Services
☐ 91.	☐	Education/Training Services
☐ 92.	☐	None of the above (1-91)

6 What is the total number of LANs, workstations/nodes at this location/ in your organization?

	At this location: LANs	At this location: Workstations/ Nodes	Entire organization: LANs	Entire organization: Workstations/ Nodes
1.	☐ 5,000+	☐	☐ 5,000+	☐
2.	☐ 1,000 - 4,999	☐	☐ 1,000 - 4,999	☐
3.	☐ 100 - 999	☐	☐ 100 - 999	☐
4.	☐ 50 - 99	☐	☐ 50 - 99	☐
5.	☐ 10 - 49	☐	☐ 10 - 49	☐
6.	☐ 1 - 9	☐	☐ 1 - 9	☐

7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:
B. The following network platforms are planned for purchase:

A	B	
❑ 55	❑	**NETWORK ARCHITECTURES**
☐ 01.	☐	SNA
☐ 02.	☐	DECnet
☐ 03.	☐	TCP/IP
☐ 04.	☐	Novell IPX/SPX
☐ 05.	☐	APPC/APPN/LU 6.2
☐ 06.	☐	NETBIOS
☐ 07.	☐	AppleTalk
☐ 08.	☐	NFS
☐ 09.	☐	Other *(please specify)* _____
❑ 56	❑	**NETWORK OPERATING SYSTEM**
☐ 10.	☐	Microsoft (LAN Manager)
☐ 11.	☐	Novell (NetWare 2.X, 3.X)
☐ 12.	☐	Novell (NetWare 4.X)
☐ 13.	☐	Windows NT
☐ 14.	☐	Windows NT/Advanced Server
☐ 15.	☐	LocalTalk (AppleTalk)
☐ 16.	☐	Banyan (VINES)
☐ 17.	☐	IBM (LAN Server)
☐ 18.	☐	IBM (PC LAN Program)
☐ 19.	☐	Artisoft (LANtastic)
☐ 20.	☐	Digital (Pathworks)
☐ 21.	☐	Other *(please specify)* _____
❑ 57	❑	**LAN ENVIRONMENT**
☐ 22.	☐	4M Token Ring
☐ 23.	☐	16M Token Ring
☐ 24.	☐	Ethernet
☐ 25.	☐	100M Ethernet
☐ 26.	☐	StarLAN
☐ 27.	☐	FDDI
☐ 28.	☐	LocalTalk
☐ 29.	☐	10Base-T
☐ 30.	☐	ATM
☐ 31.	☐	Other *(please specify)* _____
❑ 58	❑	**COMPUTER OPERATING SYSTEM**
☐ 32.	☐	DOS
☐ 33.	☐	Unix/Xenix/AIX
☐ 34.	☐	OS/2
☐ 35.	☐	OS/2 Warp
☐ 36.	☐	IBM MVS
☐ 37.	☐	IBM VM
☐ 38.	☐	Digital VMS
☐ 39.	☐	Macintosh
☐ 40.	☐	Windows
☐ 41.	☐	Windows 95
☐ 42.	☐	X Window System
☐ 43.	☐	Solaris
☐ 44.	☐	Other *(please specify)* _____
☐ 45.	☐	None of the above (1-44)

8 For which areas outside of North America do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

9 Do you have or plan to install client/server networks? ☐ Yes ☐ No

10 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes A – Installed	Mainframes B – Planned	Minis C – Installed	Minis D – Planned
1.	IBM ☐	☐	IBM ☐	☐
2.	Amdahl ☐	☐	Digital ☐	☐
3.	Cray ☐	☐	Tandem ☐	☐
4.	Hitachi ☐	☐	Unisys ☐	☐
5.	Unisys ☐	☐	AT&T GIS ☐	☐
6.			HP ☐	☐
7.			Data General ☐	☐

Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At this location: E – Servers	At this location: F – Clients/Nodes	Entire organization: G – Servers	Entire organization: H – Clients/Nodes
1. Power PC				
2. Power Macintosh				
3. Macintosh (Other)				
4. Pentium-based				
5. 80486-based				
6. 80386-based				
7. 80286-based				
8. RISC-based workstations				
9. Other				

11 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

01. ☐ $100 million or more
02. ☐ $50 million - $99.9 million
03. ☐ $25 million - $49.9 million
04. ☐ $20 million - $24.9 million
05. ☐ $10 million - $19.9 million
06. ☐ $5 million - $9.9 million
07. ☐ $1 million - $4.9 million
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $249,999 or less
11. ☐ None of the above

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

13 Estimated number of employees at this location/in entire organization:

At this location:		Entire organization:	
1. ☐ Over 10,000	4. ☐ 1,000 - 2,499	1. ☐ Over 10,000	4. ☐ 1,000 - 2,499
2. ☐ 5,000 - 9,999	5. ☐ 500 - 999	2. ☐ 5,000 - 9,999	5. ☐ 500 - 999
3. ☐ 2,500 - 4,999	6. ☐ 499 or less	3. ☐ 2,500 - 4,999	6. ☐ 499 or less

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Foundation's Distributed Computing Environment as a way to tie together multivendor network servers and services, Jarocki says.

Directory Management

Virtually all the leading NOS and messaging vendors have promised to support X.500 by next year.

However, even if X.500 provides a way for corporations to tie together multivendor directories, the standard lacks the ability to administer those directories in an integrated fashion.

Proprietary platforms such as NetWare 4.1, ENS and Lotus Messaging Switch all have strong administrative services, users and analysts agree. They include such crucial operations as implementing and tracking security, updating router tables and resolving response time and reliability problems across the different network services and user communities.

This is a major reason why companies such as Citibank and Chase Manhattan are seriously considering standardizing on NetWare 4.1 for their global infrastructure.

But Novell needs to stop waffling and commit to extending NDS to work with rival application and groupware server platforms, such as Microsoft's Windows NT, Lotus Notes and various flavors of Unix, Jarocki and Trachtenburg say.

"The objective is to make sure services are transparent, so users don't have to be concerned about what platform services are on: Unix, NetWare or NT," Trachtenburg says.

Novell and Lotus have hinted at an NDS-to-Notes integration, and Novell has been hinting at plans to move NDS onto NT and other vendors' Unix platforms for some time. No official announcement has been made, however.

Far more concrete are tools now offered by Novell and Microsoft that allow their own directory and groupware services to provide client support for, administering, and ultimately replacing rival vendors' back-end servers.

For example, Novell's support of MAPI makes it comparatively easy for a customer to migrate its cc:Mail users to Novell's NetWare 4.1 global directory and Groupwise groupware platform, Novell spokesmen says. And then, of course, they no longer need their cc:Mail back ends.

Microsoft is making it equally easy for older NetWare installations to move over to NT, via Directory Services Manager for NetWare. Now in beta, the utility is said to copy NetWare 2.X and 3.X user and group account information to an NT server. Microsoft already offers File and Print Services for NetWare, which enables clients to access NT services using NetWare access software.

Sinister as such offerings may appear from a competitive point of view, they may be just what the doctor ordered for corporations looking to make a NetWare 4.1or a Cairo the foundation of their collaborative infrastructures. "Personally, I would like to see one NDS for everything, so it would be easier to manage," Jarocki says.

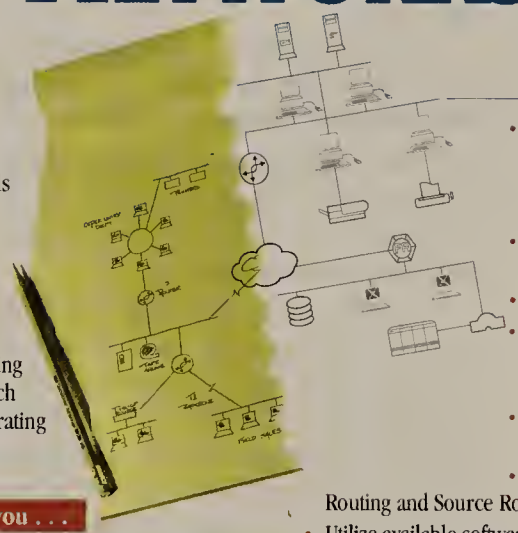
However, that is unlikely to happen, since "there is not a strong enough body of people to [push through] one de facto standard," such as Novell's, Jarocki says. NetWare 4.1 may win over the long term, he adds; but in the meantime, a vendor dogfight will erupt in which Novell, Microsoft and others will use their global infrastructures as weapons to dominate the network services markets.

"By mid-way into 1996, we'll see headaches," Jarocki says. ■

Horwitt is a freelance writer and consultant in Waban, Mass.: 75244,1666@compuserve.com

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CommerceNet:

BY JOHN VACCA

The year-old consortium is wrestling with issues of interenterprise collaboration and putting in place Internet tools that will transform electronic trade.



ROBERT PORAZINSKI

There's an Internet message waiting for Bill this morning, and you may not believe what he's going to do with it.

The message is from Irene, a design engineering manager at a large San Jose, Calif., computer maker. She wants Bill's printed circuit board design shop to bid on a sensitive request for quotation. The RFQ is only open to three firms, and the message is encrypted in such a way that only those three firms can read it.

After analyzing the RFQ, Bill tunnels through the Internet to check current prices for the integrated circuits (IC) needed to build the board. He digs into several on-line catalogs for IC manufacturers and makes rough estimates of the cost of materials.

Then he queries several engineers at Irene's company via E-mail, as well as an engineer in Amsterdam he had met at NetWorld+ Interop. The Amster-dam engineer refers him to an article in a back issue of an electronics association journal, which he promptly downloads from the publication's Web site.



Bank of America's Hicks: *"This new electronic marketplace will support all business services that normally depend on paper-based transactions."*

With all the info on hand, Bill whips up a quotation and transmits it, encrypted, to Irene. The bid is not only secret, it is also a legally binding offer. He muses about how his access to the Internet enables his tiny company to get jobs that used to go only to the big boys. His quotations are extremely accurate; he can always look up the most up-to-date prices and inventories via on-line catalogs. His designers are highly efficient; they access the latest applications and utilities from colleagues all over the world. And his cash flow is improved because he sends invoices and receives remittances via the Internet.

Sound too good to be true? Well, that vision is rapidly becoming a reality, due in large measure to initiatives like CommerceNet, a consortium of users, vendors and service providers that have banded together to explore the delicate issues of conducting electronic commerce on the Internet.

CommerceNet's founders and supporters believe that the new electronic marketplace will benefit companies by: shortening procurement cycles by up to 80% through the use of electronic catalogs and on-line ordering and payment; cutting costs by up to 10% on both stock and manufactured parts through competitive bidding; and shrinking development cycles by up to 50% through collaborative engineering and product implementation.

CommerceNet, which was seeded with $24 million in federal government and industry financing, permits companies and individuals who are connected to the Internet to buy and sell goods by using a World Wide Web Mosaic browser to find and exchange information, as well as collaborate on engineering and other projects. It is one of the first significant efforts to leverage the Internet by providing software that has the security features needed for electronic commercial transactions.

"This new electronic marketplace will support all business services that normally depend on paper-based transactions," says Mack Hicks, vice president of security systems design at Bank of America in San Francisco.

While there are other electronic commerce projects nationwide, Commerce- Net is the largest undertaking of its kind and perhaps the most aggressive in terms of the number of pilot projects it has in the works. The consortium is currently managing 15 pilots, investigating such issues as Internet connectivity, network services, payment services, electronic catalogs and directories, Internet electronic data interchange, engineering data transfer, Internet marketing and public-policy issues.

In short, CommerceNet is a hotbed of projects with the goal of sorting through the issues, defining electronic commerce standards and offering full service in 1996.

"CommerceNet is a means of getting companies together to talk about the issues of electronic commerce on the Internet, and then explore those issues of how the new Internet and technologies would be used to define new standards," says Cathy Medich, executive director of the 102-member CommerceNet.

Integrated Services

But the consortium does more than serve as a commerce forum. It provides members with an integrated set of tools and services needed to set up shop on the Internet.

Open for business

Members get affordable Internet connectivity over T-1, 56K bit/sec, frame relay or ISDN links, and interface and network software that enable them to put up interactive CommerceNet services on any Internet Web host.

An enhanced version of Mosaic, for example, provides simple point-and-click access to all CommerceNet services. Mosaic supports multimedia presentations, including audio, video, text and graphics, as well as electronic forms. A set of specialized directories help users locate CommerceNet information and services.

Rounding out the services are authentication and encryption security mechanisms based on public-key cryptography. Public-key certification services will also be provided to CommerceNet members.

A Meeting Place

Buyers and sellers will be able to meet on the network and safely exchange sensitive information such as credit card numbers and bid amounts, sign legally enforceable contracts, maintain audit trails, and get paid through cooperating financial institutions.

Data and transmission security issues are minimized on Com- merceNet because there are no remote logins, and private information, such as passwords, is encrypted. Digital signatures ensure that information is delivered uncorrupted and tamper-free.

Participating companies are expected to use CommerceNet to provide customers with on-line catalogs, product literature and on-line ordering services. Job shops will provide on-line access to engineering and manufacturing services that are faster, cheaper or better than those available in-house. Companies will also use CommerceNet for competitive solicitations and bidding, interactive EDI and intercompany collaborative engineering and product data exchange.

"Our experience has been positive up to this point," says Mike Gordon, manager of the electronic commerce group for Avex Electronics in Huntsville, Ala. "We've enhanced a lot of our relationships with our customers and suppliers. We've also identified some potential benefits in the pilots we're working on, like EDI and doing RFQs over the Internet. So it's been very positive up to this point."

Handling Orders and Payments

One of the most positive developments that has come out of CommerceNet so far has been the work on establishing guidelines and standards for taking orders over the 'Net and handling remittances.

It is unlikely the consortium will impose any one method for taking orders or handling payments. For example, CommerceNet member Spyglass, Inc. of Naperville, Ill., says it has introduced its own model. It erected an electronic storefront with an on-line catalog that lets buyers place orders and review their purchases.

But the biggest issue with regard to on-line purchases is security. "That's why we developed an on-line cyberwallet," says Bob Rybicki, vice president of marketing for Spyglass.

The idea is to allow people to encrypt credit card or checking account information for transmission across the Internet while leaving everything else in clear text. "Our belief is that most people just want to do simple transactions and buy goods using a credit card or checking account number. As long as we can make that secure over the Internet with no more risk than you take using your credit card in a restaurant or store, the rest of the paradigm should remain the same."



CommerceNet's Medich: *"CommerceNet is a means of getting companies together to talk about the issues of electronic commerce on the Internet, and then explore those issues of how the new Internet and technologies would be used to define new standards."*

A Work in Progress

Electronic ordering and payments is a work in progress. "We've been learning from one of the pilots that's concerned with payment mechanisms," says Bank of America's Hicks. We found that debit cards may prove to be a higher cost transaction than some other payment mechanisms, and they do not seem to be something that the merchants really want.

A number of vendors are just now bringing to market products to secure clients and servers on the Internet. But CommerceNet's Medich says that's only the tip of the security iceberg.

"There are several pieces of security. One is that you want to encrypt the transaction so that it is private. You also want to authenticate the buyer and seller. You want to know that the buyer is who they say they are —and, you want only to provide, in some cases, access to certain buyers."

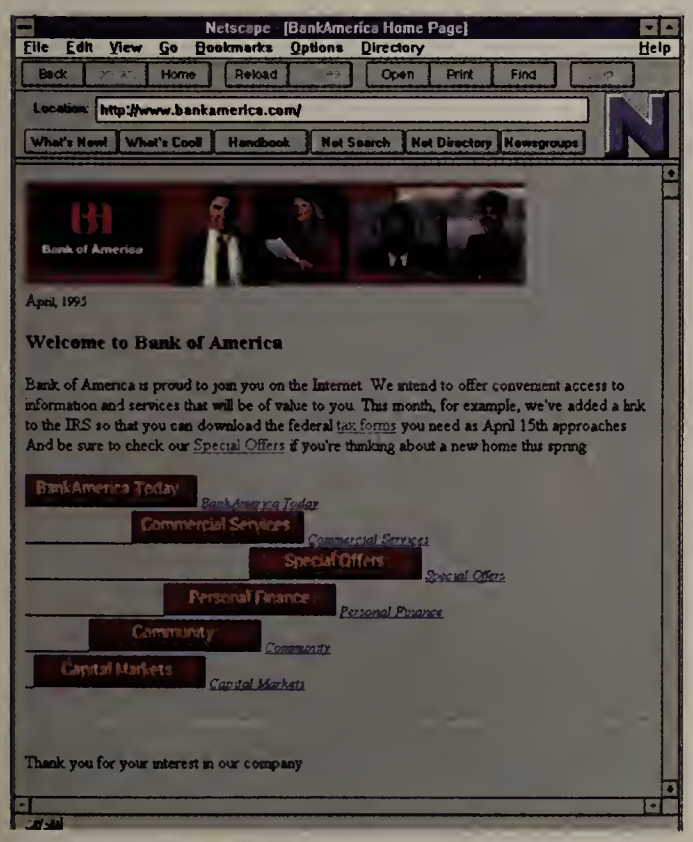
Authentication requires using the same public key technology used for encryption.

Medich says CommerceNet is currently piloting its own certification authority but adds that there is a national, even global, need for this type of service. "Our pilot operation provides that service. But there needs to be a whole commercial infrastructure developed. The U.S. Postal Service has announced plans to do that. We believe a number of financial institutions will take that on, as well," she says.

The Future

CommerceNet organizers believe that the majority of U.S. companies may conduct business via the Internet within five years.

The consortium intends to explore



Bank of America *greets Internet users with its home page.*

such future technologies as: intelligent shopping agents that can search through catalogs and negotiate deals; collaboration tools for distributed work teams that support both real-time interaction and video mail; natural language search-and-retrieval techniques for large distributed information bases; and format translation services that enable engineering organizations to exchange product data even when they adhere to different standards.

CommerceNet is a step toward a de facto National Information Infrastructure capable of linking up with smaller electronic commerce projects in places such as Boston, Austin, Texas, and the University of Illinois. Potentially, a CommerceNet-like infrastructure could support other national efforts in the areas of education, health care and digital libraries.

But first, CommerceNet needs to bring some definition to the many electronic commerce issues it has tackled. Bank of America's Hicks says the consortium is well-positioned to do so.

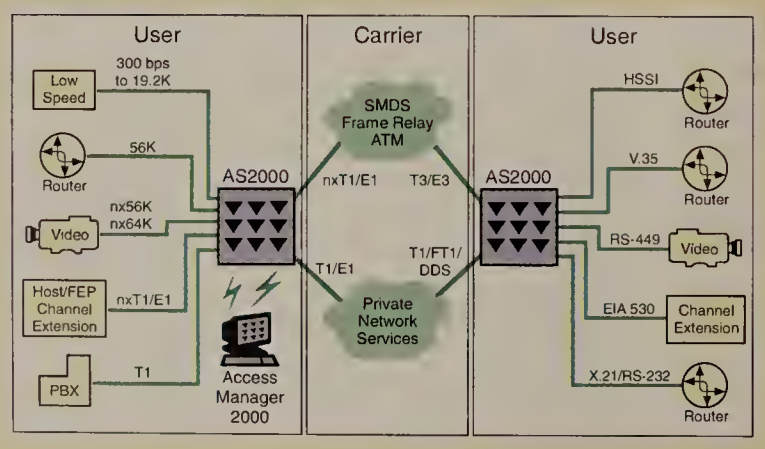
"We have virtually every industry leader in the electronics, computer and networking side, along with many leaders from banking and insurance companies," he says. "There's a terrific synergy here. People are committed to doing commerce on the Internet." ■

Vacca is a freelance writer based in Houston: jvacca@hti.net.



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The Web: Notes friend or foe?

BY JOHN DIX

John Landry, vice president of Lotus Development Corp.'s advanced technologies group, says he spends 80% of his time thinking about the World Wide Web. And well he should. At some levels, Web technology represents a real threat to the lord of the groupware kingdom — Lotus Notes. He admits as much but says Notes has more to gain from acceptance of Web technology than it stands to lose. Notes, he contends, is the single best tool in the industry for managing Web sites, many of which are just now being built. Landry shared his thoughts about the Web and what it means to Lotus with Collaboration *Editor John Dix and* Network World *Staff Writer Annmarie Timmins.*

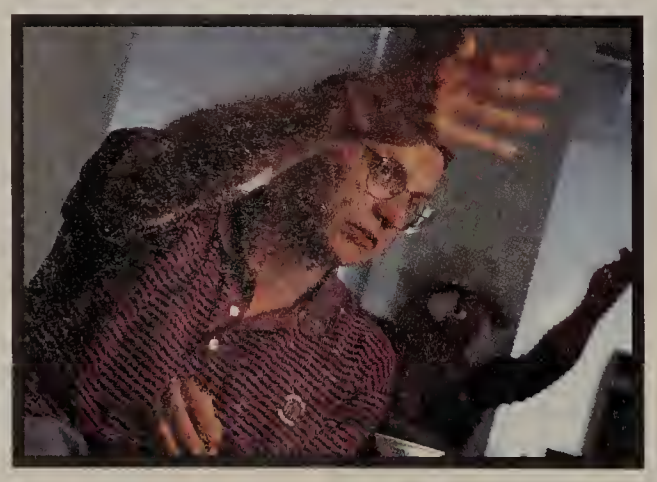
COLLABORATION: What does the Web give you if you're already a Notes shop?

LANDRY: From a high-level strategy point of view, we look at three things occurring here. There's enterprise-level computing, interenterprise computing and what we call extraenterprise computing, which is the extension of computer systems out to the public at large.

We all know what enterprise is about.

Interenterprise typically is going to be applications that are being shared among companies where security is important, where replicated databases are important, and that is a wonderful place for Notes to be. That's a lot of the AT&T Network Notes environment. And it's also a lot of what you'll see us do with Notes over the Internet, meaning Notes as the application using the Internet as transport. We do that already in Notes Version 3. In Version 4, that's going to be a much more exposed facility.

Then there's extraenterprise. And we look at extraenterprise as being this brand-new area of interfacing computer systems to the public at large. Our Web site, for example, has 25,000 documents. Customers can go to that Web site and get answers to their questions instead of calling us up 24 hours a day, seven days a week.


SHAWN HENRY

So that is a new capability in that it enables us to provide better customer service at reduced cost. Oh, by the way, at the same time you'll probably have to go through a couple of marketing messages about new products we're announcing in order to get to the customer service page. So, we have an opportunity to market to the public at large through this vehicle. Never before has that been possible. That's a big deal.

If this is something that companies want to do, create an electronic presence, and they want to do it in a meaningful way — not just put 25 documents on a Web site and call it a day — somehow they're going to have to manage that site.



And when we did it for our company, we quickly found out we wanted to have all the marketing information up there, all the customer support information up there, all the press releases up there, our financial statements up there, and we'd like to put our help wanted advertising up there because that's a good place to find people.

So, by the time you're done, who's in charge of all that information? Every - body, nobody, right? It's distributed. You've never had a requirement before in your organization to centralize all your public information, so you've got a couple of problems.

One is, you've got an organizational problem, which is a process problem of collecting that information from all over the world, centralizing it, securing it, making sure that people aren't putting information that you don't want to have in there.

And how are you going to manage it? It changes everyday. What are you going to do, have everyone send E-mail messages to a central site and have someone input the changes? There is no good authoring control workflow environment to make use of this phenomenal facility. Except one. Notes.

Notes has been doing this type of thing for years, which is collecting information from all over the world, putting it in different places by its replication engine and securing it to make sure that unauthorized people can't update documents that they're not allowed to.

And what we did was take that idea and extend it so you can use Notes as your authoring workflow process management system. You can put the information into Notes databases using Notes forms, using Notes:Views to catalog all the information. And we'll take all that information, and we'll dump it into an HTTP file system and take that HTTP file system and put it up on the Web. That's what our InterNotes product makes possible.

And InterNotes also happens to get rid of the second big problem with big Web sites. Besides the process problem of gathering all the information, you have the technology problem of the HTML link environment, the connections between Web documents. Every document in a Web site is a file, so when you put in a link to someplace else, you have to link that file to a file name for this other file that contains that document.

Well, do that a few times and then try to change it because now you find yourself in an environment where every time a document is added you have to change at least one document to point to it. Do that a few thousand times and then start deleting documents because the document you deleted might be pointed to from 15 other documents and you've got to figure out which document pointed to it so you can repair the links from the document that's being deleted.

The end game is you find two things on Web sites. They're either really stale because people have given up on this. Or they're very small because this HTML link architecture does not scale for humans. It scales for computers.

Well, we have this thing called Notes. You add a new document. It appears in



a Notes:View. Views are lists of documents and they're categorized. Those views are automatically updated every time there's a new document put in, every time a document is deleted.

What happens is InterNotes Publisher just takes what's in the Notes database and publishes them over to the Web as documents. And it also publishes its views. So, those views become hypertext links, which, in turn, are the vehicles which are used to navigate through the database.

So from a Notes user's perspective, they've got an incredible Web authoring and process management tool to really exploit the Web.

COLLABORATION: OK, that's the promise. Let's talk about the threat of the Web. There's been talk about large shops simply using Notes for E-mail and simple bulletin board functions, the kind of stuff the Web can do well. Doesn't that add up to a substantial threat?

LANDRY: If everybody wanted to drive a Yugo, I guess Yugos would have been a threat to Chevrolet, or even Porsche. But Yugos weren't really perceived as such.

If you set your level of expectation very low about what this type of technology can do, well then the Web is a threat. Notes has proven that it can do a hell of a lot more than that for those people that recognize the value of doing a lot more than that.

Now the Web added another dimension to this, which was providing a multimedia environment at very low cost on multiple platforms for largely information dissemination.

That has been an area that Notes participates in. Again, the Web is not in any way as good as what a Notes system can do. I mean, as simple a thing as user authentication doesn't exist in the Web. So, if you don't care about the documents you're distributing being secured, if that's the type of information distribution you want it to have, well, have it.

COLLABORATION: As Web technology continues to evolve, it can only stand to become more of a threat. Say it does gain authentication and security, what's your pitch then?

LANDRY: Well, I would say we probably know more about that than anybody. So we might, in fact, be the ones that introduce it. We are full-fledged members of the Web consortium [at MIT]. We in fact chair the collaboration committee for the World Wide Web consortium.

So, our idea is to exploit this. And we think that we've got product in-market now that is pretty hot, and you'll be seeing in the next release of the InterNotes Publisher some unbelievable facilities integrating the Web with Notes on the backend.

COLLABORATION: What kind of facilities do you mean?

LANDRY: Well, if you're trying to get a subscription to your magazine over the Web, you probably want some level of form to be filled out. When somebody fills out the form, where does it go? Somebody has to write a program to do that now. And somewhere you're going to have to have a database, and probably you want to somehow have some sort of an approval process for routing the subscription through some workflow environment.

That Notes thing does workflow. And it's got that database, doesn't it? And Notes has a forms facility. Wouldn't it be cool if we could just take that form that we built in Notes and push it right out into the Web, and somebody fills it out and it comes back and updates Notes. When it updates Notes, there's a trigger event that says, 'Here's a new subscription. What's it for? It's for *Network World*. Route that to Billy Bob in Notes and have Billy Bob do the approval.'

In other words, you're extending your business process directly out into cyberspace to the public. That business process system you already built in Notes can, with virtually no change, extend right out to the public at large.

The whole idea of using forms on the Web all of a sudden has this incredibly powerful backend.

COLLABORATION: Will this version of InterNotes be totally new? Rumor has it that the current version is based on acquired technology and Ray Ozzie is developing the next version, the real version.

LANDRY: I'll give you a dollar for every line of code you can find in the product based on the technology we acquired from Corporate Software. That code, as it turned out, was not very good. And although we used it in the early releases, we have subsequently replaced all of it. We thought the code would give us a faster time to market, and to some degree, it did. But they didn't have enough knowledge on how Notes really worked. And so we rewrote all that.

COLLABORATION: Will you sell Web browsers?

LANDRY: Well, there will be a Web browser in the V4 client. For example, in Notes Version 4, you can have a Notes document and a hypertext link out to the Web, just like you would have in a Web document. When you click on that link, Notes will route through the server to the InterNotes gateway, out to the Web at the server level, bring back that document and display it as a Notes document.

The fact is it's not just displaying it as a Notes document, it has become a Notes document. It is now in the database as a Notes document. Why is that cool? Because now you can have agents that are looking at those documents that came from the Web.

Maybe, for example, you don't want to go up to the Microsoft site every day to find out whether they've got any new documents. Instead, write an agent in Notes to go out to the Microsoft Web site and then inform you if there's any new pages that you might want to look at and send them to you via E-mail.



So, you're starting to layer a programmability environment from Notes on top of Web-based information and almost making them transparent as to whether you're dealing in the Notes or Web environment.

That is an inversion, if you will, and this gets confusing, of what the publisher is about, which is to take Notes information and make it accessible to Web clients. This is to take Web information and make it accessible to Notes clients.

Now, that wasn't really the answer to your question. The question of whether we are going to do a Web browser without Notes? More to come.

COLLABORATION: How soon will we see something like this?

LANDRY: Well, not tomorrow. I'm not announcing anything. But it would be interesting. The fact is that our illustrious par-



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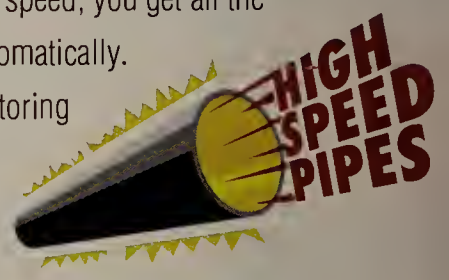
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ent happens to have a few products with Web browsers built in and will be releasing browsers on different platforms. It's not a Lotus product. But you may see Lotus coming and taking that to a new dimension.

COLLABORATION: Speaking of your new parent, what kind of doors does the IBM union open?
LANDRY: There are some phenomenal opportunities here. For example, IBM, with its Global Network, wants to become one of the world's largest Internet access providers.

When you have a wonderful network and thousands of customers signed up for that network, there is a great opportunity to leverage it by perhaps putting InterNotes and Notes servers within the cloud. Customers could author their Web documents using Notes, replicate to IBM, and then IBM could take care of the translation process and the hosting of the Internet site for the customer.

Further, Lotus was lacking one, in my opinion, critical piece of platform technology: a relational database. We didn't have one. They do and it's DB2, which happens to be some of the best distributed database technology on the planet and just happens to be in just about every site of any significance in the world.

DB2 runs on OS/2, multiple variants of Unix and will be running on NT. As a fully distributed relational database system, there's an opportunity for us to be able to integrate that technology closely with the Notes environment and such things as workflow.

That's a very attractive one, particularly given that most transactions are processed on mainframes or AS/400s. So, being able to build the system in Notes and having a great path to get to the mainframe transaction processing system to do the actual work is something unique we can do. So, I think there are great opportunities there.

COLLABORATION: How will you deal with IBM's desire to mettle with development directions?
LANDRY: With time. I mean, IBM has bent over backwards, almost to a fault, on the independence issue. Look, the advantage is not to be independent. The advantage is to be integrated. We've got unbelievable opportunity here, so don't keep telling us that we're independent. It wouldn't make sense to do that.

We don't want 500 IBM people coming in each week to see what this Notes thing is about, but IBM has been respectful of that. So, it's a balance we're looking for. Right now we're kind of feeling each other out.

COLLABORATION: Will IBM have input on Notes 4?
LANDRY: I think Notes 4 is in the can. So Notes 4 is original, it's first beta. They'll have some input in Notes 5, I'm sure.

COLLABORATION: Going back a moment to your comment about leveraging the IBM network, the hooks in Windows 95 to the Microsoft Network would seem to give Microsoft an interesting new collaboration tool. What's your take on this?
LANDRY: We'll see how that goes. Besides the antitrust problems they face, the biggest threat to Microsoft is the Internet because the Internet is the first place that is democratic. From their historically totalitarian view of the world, they can't own it. And I think this is troubling them.

In fact, I think that it's troubling them to the extent where they got whipsawed by it. They thought the original Microsoft Network was going to be their play at CompuServe, Prodigy, and from that perspective it was very powerful. The problem is, while they're watching those guys, this Internet thing came about. And the Internet is a completely different model. It's a model of pure democracy.

I have a Web site at my house. You never had that before. You had to go to AOL or somebody to be a publisher, an information provider. Now, everybody in the world can be an information provider and they're all linked up with everybody else, using a killer interface, Mosaic. And it is the killer interface to not one machine, but to the entire world of machines. That is unbelievably powerful.

Microsoft doesn't own that interface, nor do they own the network. So, they're going to try to push a proprietary development environment, Blackbird, for a proprietary network, MSN, against an open, free, democratic society that is moving at an unbelievable pace.

Well, their stuff better be really hot because the stuff on the Internet is really hot. And what's their big advantage here? If I can click to get to the Internet and I can get anywhere in the world, why would I just want to go to Microsoft? So, I think MSN is going to, over time, turn into yet another Internet access provider.

COLLABORATION: Some critics say that Lotus made a mistake several years ago in trying to offer Notes as an alternative to the Internet instead of pouncing on Web technology and tightly integrating it with Notes right away. If you could go back five years would you do it differently?
LANDRY: I wasn't here five years ago.

COLLABORATION: Presuming you were.
LANDRY: I am proud of how fast we did react in getting very good product to market. So the question would be, could you have been Mosaic? There's one major-league problem: We are a profit-making organization. We have to pay people real money that we collected from selling products to other people. Mosaic and HTTP servers both came out of the academic environment and were largely funded by the government and were distributed free. Mosaic used to crash your system repeatedly. Who cared. You didn't pay anything for it.

And now the browsers are still perceived to be free. But they're not really. If you read the Netscape license, it's $39 for that client. What's a Notes client? $100.

So all right, now Netscape's going to probably put more functionality into things like authentication, a certificate model, maybe some sort of indexing or viewing facility, maybe a full-text search engine. Do you think they're going to charge $39? Oh, it'll probably become $59, $69, $79, oops its 100 bucks. You could have bought Notes for 100 bucks today and gotten all that stuff, but instead you've decided to go for the $39 product that doesn't do much.

And this is what people don't realize. They perceive Notes as expensive because they all remember when it was 500 bucks. They perceive Netscape as free because that's how they got it. But it's not and what's happening here is a very bizarre situation of people perceiving things to be free that aren't and people thinking that things are expensive that aren't.

COLLABORATION: Let's go back to the original question. Would you have done anything different given the chance to do it again?
LANDRY: We couldn't. We couldn't because we had to make money. These tools were free. If you don't pay for it or perceive it is free, you don't perceive it should work nor that it should work reliably, nor do you mind not getting very good customer support.

But we couldn't do that. The verdict is out on whether the Netscape model will work even at $39. It's awful hard to make money at $39, particularly if you start discounting from there. I mean, we know that Netscape has been selling clients into corporations for $5 a copy with the hope they'll get the server business because their servers are $5,000 to $15,000.

Well that ain't cheap. You know what a Notes server costs? $300. There's something wrong with this model. So, I think you may see some changes in pricing models, either by them or by us. But right now we sell servers at the same price that we sell clients 'cause we thought that would be easier for customers to understand.

The biggest threat to Microsoft is the Internet because the Internet is the first place that is democratic. From their historically totalitarian view of the world, they can't own it. And I think this is troubling them.

Netscape gives away clients to sell servers that are $15,000. Eventually those things have to start reconciling, and unfortunately there's a perception problem that Notes is expensive.

COLLABORATION: How much of your time is spent thinking about the Internet?
LANDRY: About 80%.

COLLABORATION: So, it's a big deal for Lotus.
LANDRY: It's a very big deal for Lotus. It changes so much, and not just in terms of product. It's in terms of channel.

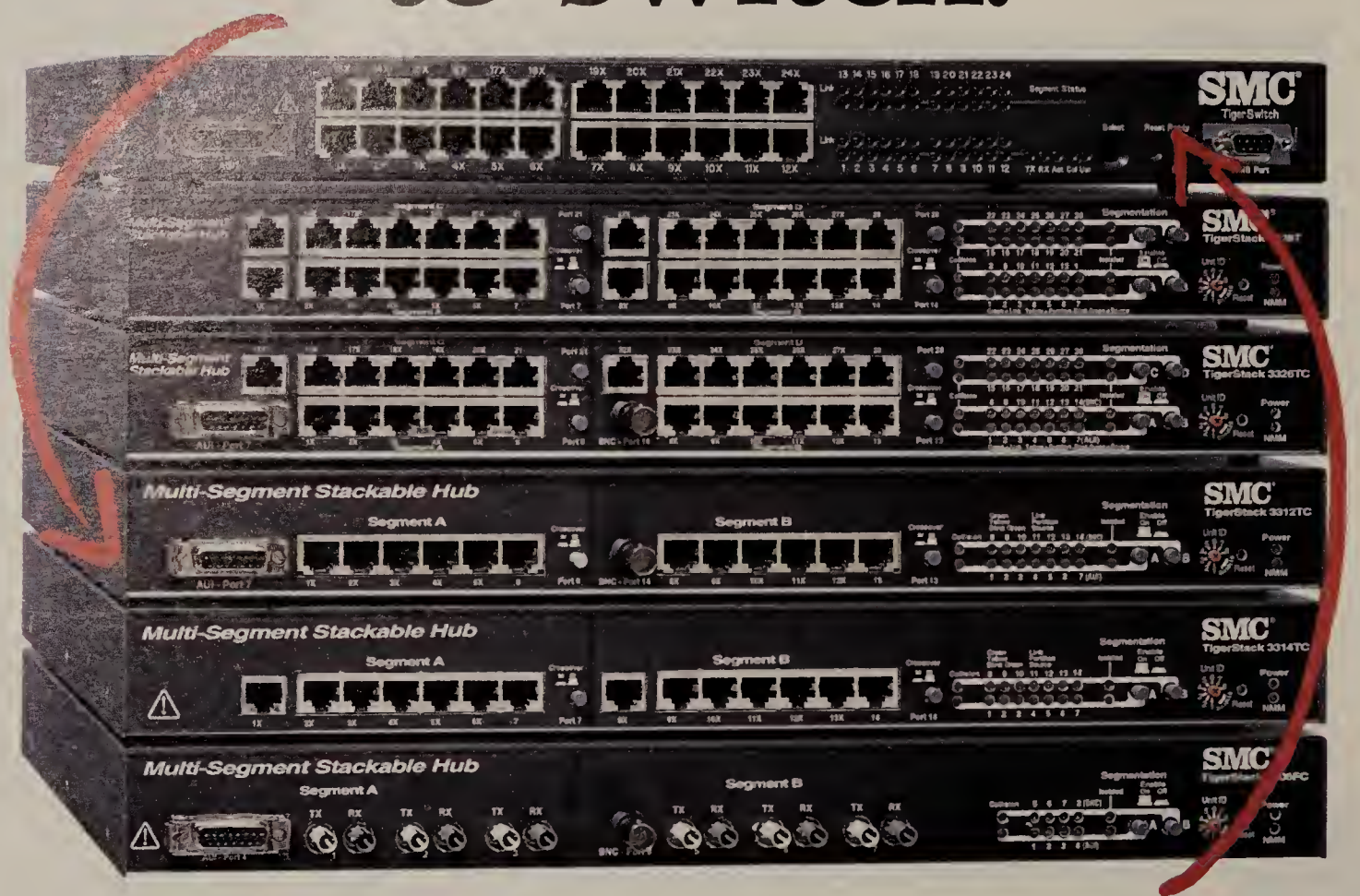
For example, we will be introducing a set of objects, sometime. I'm not going to tell you what those objects are, but they're objects that can work inside Notes. They can work inside OLE [Object Linking and Embedding] objects. They do wonderful things, but they're limited. They'll just do what they're good at so they won't cost very much.

If they don't cost very much, how are you going to make any money selling them? Well, sell them electronically. Deliver them electronically, and that way you don't have cost of inventory. You don't have multiple two-tier distribution model discounting. You get to realize it all yourself. You are the channel when you're an electronic vendor.

So my point is that it isn't just a product issue. This is a whole change to the software business. And it's an excellent way to showcase our own technology, of how we can do electronic commerce using our technology to deliver and sell and account for and bill and secure our own transactions with our customers.

So, that's another thing on my plate, the Lotus Web site itself and how it evolves to support customers to market our products and to ultimately sell and distribute our products. ■

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Circle Reader Service #42

Private Webs:

the inside story



BY MARK GIBBS



WILL TERRY

Internal Webs offer advantages over traditional MIS distribution solutions.

Face it. MIS is usually overworked and underfunded. That makes achieving strategic goals like establishing a corporate information distribution system daunting. You can't afford to buy expertise, don't have the budget for top-end solutions and don't have the time to do it yourself.

Electronic mail can be a solution for information distribution, but your goals can't call for real-time interaction or complex data presentation (text with graphics, sound and so on).

The top-end groupware products such as Lotus Development Corp.'s Notes are profound solutions, but the cost per seat, the length of the implementation schedule and the learning curve to build an effective system are significant burdens for overstretched MIS resources.

The ideal would be an information system that is simple to implement, comes ready-to-run, supports multimedia, is multiplatform, is based on standards and is extensible. While we're at it, the system should also be easy to use, easy to support and be comparatively cheap.

Is this but the febrile dreams of an exhausted MIS slave?

No! The technology does exist. It is called the World Wide Web.

Web History

The World Wide Web was created in 1989 at CERN, the center for high-energy physics in Switzerland. The concept was to provide an information delivery tool that allowed the creation of hot links within and between documents. This allowed complex interconnections between data to be established and explored.

While the Web had considerable success in the scientific community, it wasn't until 1993, when the National Center for Supercomputing Applications released a tool called Mosaic, that the Web became a "killer application."

Up until the release of Mosaic, the browser programs that gave users access to Web data had been solely character-based. While this worked well enough, the lack of graphics and clumsiness of the user interface gave the Web limited appeal.

Mosaic was the first graphical user interface-based browser, and the simplicity of a point-and-click interface combined with multiplatform implementation were the key factors in its success.

Since then, the growth of the Web has been meteoric. There are now more than 30,000 Web servers worldwide,

Web server choices

If you plan to use a Unix system, there are two public domain choices: CERN and NCSA servers.

Which one you choose will usually be based on your system manager's preference (these things are often a religious issue for system administrators).

In the commercial Unix arena, Sun's Netra server systems come preconfigured for Web service. Other platform-specific vendors include Netscape Communication Commerce Server, and Silicon Graphics, with its WebForce (Silicon Graphics acts as an OEM for NetScape's product).

An excellent shareware choice for lower performance environments is Bob Denny's adaptation of the NCSA Web server to run under Windows 3.1. You can find this software at http://www.city.net/win-httpd/.

Alternatively, commercial Windows 3.1 Web servers are starting to come to market. The latest is called WebServer from Quarterdeck Corp. and includes extensive Web creation and management tools.

However, driven by price and performance issues, there is a strong market building for Windows NT-based servers.

A good example of a commercial NT Web server is Purveyor from Process Software. This web server (based on the EMWACS Web server from Glasgow University) takes all of 20 minutes to install, even if you haven't seen it before. The documentation consists of two slim volumes: one on the Web server and the other on Web security.

Process also includes extensive information on using the FreeWAIS engine to provide a back-end document indexing service to allow large documents and document collections to be easily and efficiently searched.

Another choice might be WebSite from O'Reilly and Associates. WebSite is an adaptation of Bob Denny's NCSA HTTPD, and includes a number of enhancements that make Web system creation and management much easier.

The documentation for WebSite is more comprehensive than Process Software's, as O'Reilly's target market is intended to be more general than system administrators.

The additional tools include an editor for image maps and WebView. WebView is an excellent utility that provides a graphical view of your Web and its links, and it even launches your preferred Web document editor.

WebView also includes a "wizard" feature that allows Web documents to be created through a forms-driven interface.

For sites that have a strong investment in Novell's NetWare, there are no fully released choices yet. The company closest to full release of a NetWare Web server is the Great Lakes Area Commercial Internet.

Not to be excluded, IBM is getting into the act with Web servers for OS/2, AIX (both available last month) and MVS (currently in beta test).

and that number is growing exponentially.

Private Webs

But while the Web is established and well understood in the public domain, it is only just gaining recognition as a powerful and cost-effective tool for private corporate environments.

A private Web can be the basis of a whole range of corporate services, but the most general use is as a common front end. Because browsers are available for most platforms and because they can share the same documents, Web technology can be used to create a consistent corporate information vehicle.

As a front end, a Web browser would be the first program loaded by a network workstation. The default home page -- that is, the first document that gets loaded automatically -- could be a "hot news" or bulletin board-style page.

And as the Web supports links to sound and other multimedia data files, the home page could even carry an audio or video message of the day.

The data within a private Web could be almost anything of relevance to the company. This might include project documents, corporate reports, material and service order forms, process monitoring and document libraries.

Creating Corporate Culture

A powerful idea is to use a Web as a human resources (HR) tool. By creating a page for each employee and having the users maintain their own job and personal information, the organization gains a truly comprehensive telephone/E-mail/location directory.

Such a Web can provide a strong integrating factor for the corporate culture. For example, a private Web can support directory services to find someone by name, job function or other attribute, and then be used to send a message. Indeed, with a little creativity in building back-end services, you can implement virtual bulletin boards the staff can use to post their own notices.

Another potential use for a private Web is to make company policies and technical manuals easily and accessible.

A private Web is exactly like the public version with the exception that corporate Web services cannot be accessed from the outside world. If, for example, you put detailed HR information online, you will certainly not want this accessible from the outside.

The only ways to achieve adequate isolation are to either ensure complete physical isolation from external connections or hide internal Web servers behind a firewall.

Putting a Web to Work

To build an internal Web, you'll need an HTTP server and Web clients. Your choice for a server will depend on what platform you're planning to accommodate, what features are required and what additional facilities are available.

Items that should be on the required feature list include security, administration, access controls by user and by groups, support for file archives and a simple management interface.

The cost of Web servers range from free to $5,000, but the vendor's contingent support (or lack of it) will probably determine which product suits your organization best.

Once you've selected a Web server, you also need to consider which browser to use. If you are looking for the greatest versatility in data presentation and the broadest range of features, the current leader is Netscape from Netscape Communications. Alternatives include browsers from NetManage, Spry and a number of other vendors.

The key issue in ensuring that a private Web delivers maximum impact is control over document rendition, and unfortunately, these browsers are all less rich-



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*Circle Reader Service #***29**



ly endowed with this control than Netscape.

The only commercial browser to support what is called "kiosk mode" is Spry's Air Mosaic. This allows the menu bar at the top of the main application window to be hidden. When combined with a touch screen, kiosk mode makes public access practical and secure.

One failing of all current browsers is a method for controlling browser configuration. This means that a user could select inappropriate settings — for example, choose a proportional font where a fixed width one would normally be used. While there are workarounds, such as making configuration files read-only, the fact that the configure option can't be hidden is a potential problem.

Building Your Web Documents

To build Web content, there are a number of editors in the marketplace. One of the most accessible, albeit amongst the slowest, is Internet Assistant for Microsoft Word 6.0. This makes it fairly easy to create and edit Web documents and has the advantage of being free from Microsoft.

Other mid-range solutions for PC platforms include tools from Quarterdeck, SoftQuad and a whole flock of independent vendors.

At the other end of the spectrum is the bundled editor that comes with Silicon Graphics workstations. This utility gets very high ratings for ease of use and allows for drag-and-drop construction of Web documents. For example, text and graphics can be simply dropped into an HTML document from the system desktop.

Obviously, your choice of editing tools will depend on the platforms available within the corporation. That said, it may be worth taking on a new platform to get the best-of-breed tool set. The right tools will make Web construction and management simple and efficient.

But whatever tool is used, developing a house style for documents is vital. For example, this style might define that all pages contain the same elements, such as corporate logos and authoring data. A top-level corporate edict should also be issued to ensure that standards will be followed.

This means that as the various groups and departments in your company start to create and manage their own areas of your private Web, the corporation's information about itself has consistency and cohesion.

Building Understanding

As with all other MIS projects, an internal Web should have senior management buy-in, and, in practice, this shouldn't be hard to achieve.

Perhaps the most important technique is to make sure that corporate issues are really addressed by your internal Web system. Things like share prices and market-related news are some of the easiest features to introduce and, combined with strong design, the utility of your Web could be demonstrated on the first day of rollout.

Once the system is in place, monitoring use and keeping the documents fresh will ensure that your corporate Web becomes a focus for corporate communication.

Compared to a lot of the other tasks that land on the shoulders of MIS, building a private Web will be one of the most cost-effective and simplest things you'll ever do.

The challenge is to identify and assemble the right components, including Web servers and clients, and Web document editing tools.

But once you see just how easy it is to build an internal Web, the alternatives don't look like alternatives at all. ■

Gibbs is a consultant and author in Ventura, Calif. : mgibbs@gibbs.com or (800) 622-1108. ext. 504.

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JULIETTE BORDA

The case against network diversity

BY DAVID CHAPPELL

The world was once so simple.

Mainframes were accessed via terminals, and all applications ran in that complex but controllable environment. In many organizations, most of the hardware and key parts of the software flowed from the fount of IBM, and this consistency led to a manageable, workable environment.

Today, of course, that simple world has exploded into a plethora of clients, servers, networks and more, with applications seemingly running all over the place. To make things worse, it can seem as if every part of this brave, new world comes from a different vendor. Complexity has skyrocketed, and control can sometimes appear impossible.

This can't go on. The rampant system diversity in today's corporations may have benefits, but those are far outweighed by the drawbacks. Furthermore, this diversity is in large part only an artifact of the rapid changes that have occurred in the last dozen years. While there's plenty of historical motivation, there is no intrinsic reason for it to exist in many, perhaps most, cases.

Moving to a simpler, more manageable world means making choices and sticking to them. Nowhere are these choices more important than in the basic infrastructure services for collaborative computing: operating systems, supporting services for distributed applications and, soon, a component software infrastructure.

And while these choices may appear to be independent, they are in fact closely linked because making a particular choice in one area strongly biases the choice in another.

Client Operating Systems

There are four widely used operating systems on client workstations: Microsoft Corp.'s Windows, Apple Computer Inc.'s Macintosh operating system, Unix and IBM's OS/2.

Five years ago, each had its own niche: Windows was for simple, cheap clients, the Mac was for the well-heeled ease-of-use crowd, OS/2 was for highly functional clients in IBM-oriented shops, and Unix was for engineers who needed powerful workstations.

Today, these distinctions have all but disappeared. Very soon, all four will be multitasking, graphical user interface-based systems that run on powerful machines. While many corporations have an installed base that includes all four choices, the rationale that created this diversity has largely disappeared.

What this means is that organizations can now choose a client operating system on the basis of whether it supports the applications they want to use. For most companies, this means Windows, since it boasts by far the largest application base of the four.

Server Operating Systems

On the server front, a typical configuration today is to have three categories of devices, all accessible from clients. The oldest are traditional hosts, which, for the most part, run MVS.

The terminals that provided access to those hosts changed into PCs several years ago, ultimately giving rise to LANs as a way to share files and printers. Despite the hoopla about Microsoft's Windows NT, by far the most widely installed network operating system (NOS) is Novell, Inc.'s NetWare. Other choices include IBM's LAN Server running on OS/2 and Banyan Systems, Inc.'s VINES.

The third category is also the most recent addition to the server pantheon: application servers. As the client/server wave washes over our industry, organizations are installing machines expressly to run the server piece of this equation, commonly a database manager of some kind. The most popular choice for an OS here is some variant of Unix, with Windows NT as its most visible competitor.

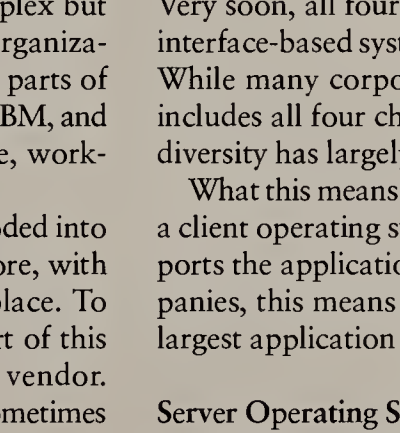
Simplifying the Picture

Application servers and file servers are on a collision course. There is no reason to run two different operating systems on these systems when a single OS will do.

Users can select a server OS that both provides file and print services and serves as a general-purpose application server.

The implication is clear. NetWare,

opinion



STEVE NIEDORF

The author argues that diversity is a vestige of a time gone by, that the drawbacks outweigh the benefits and it's high time to simplify.

as it stands today, and despite its huge installed base, is the wave of the past. Novell has implicitly admitted this with its talk about a (since renamed) "SuperNOS" that would combine the best of NetWare and the more general-purpose Unix.

In fact, Unix is one obvious choice for an OS to play both roles, and it's not infrequently used this way today. But servers exist to serve clients, and the best server is the one that best matches its client. Since the dominant client is Windows, there's a strong argument for the eventual emergence of Windows NT as the dominant server OS. Like Unix or Novell's eventual Unix/NetWare hybrid, it can play the role of both network file server and application server.

While this scenario leaves users even more beholden to Microsoft than they are today, it also has the potential to make their environments simpler and easier to manage. For organizations that choose a more mixed base of client operating systems, this argument is much less strong. In this world, it's easy to imagine that the current dominance of Unix for application servers will only grow stronger.

Choosing Distributed Services

In some ways, settling on a common approach to providing key distributed services is easy because there aren't many choices. Unfortunately, none of them are perfect.

The first technology that comes to most people's minds here is the Open Software Foundation's Distributed Computing Environment (DCE). DCE is still among the best choices for a distributed computing infrastructure.

The reason is simple. There's nothing else out there that runs on a wide diversity of systems, supports client/server applications, and still provides effective security and directory services for all of those applications. The strikes against DCE include its daunting complexity, its lack of object-orientation and the challenge it presents to network administrators.

Still, it's pretty much the only game in town for a multivendor environment. Potential competitors all provide some useful part of the distributed computing infrastructure but typically fail to define the key service set offered by DCE.

NetWare stalwarts may beg to differ. Novell offers the NetWare Directory Service (NDS), which despite its name, actually provides both directory and security services, and Novell clearly wants to promote NetWare as an enterprise server. Choosing this path once again implies a linkage between different infrastructure components. NDS implies NetWare, NetWare (eventually) implies NDS. While Novell is clearly trying to broaden NDS' appeal, it is still very much wedded to a particular choice for a server operating system, something that's not true of DCE.

Defining Component Software

The key to future infrastructures will be their component software architectures. Unlike typical object software technology, components can be distributed in binary form, and applications built from components can have some pieces upgraded without requiring any changes (not even relinking) of their other components.

As is so common today, the choice breaks down into Microsoft and everybody else. Microsoft's entry is OLE and its foundation, the Component Object Model (COM). The "everybody else" option is OpenDoc, produced by Component Integration Laboratories (CIL). CIL's primary sponsors are IBM, Apple and Novell. The choice for component support is tied directly to the choices made for operating systems. While it is available for other systems, OLE will be directly wired into Windows and Windows NT. Choosing one of these systems means choosing OLE — it can't be

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avoided, if only because the operating systems themselves will provide more and more of their services as OLE components. Over time, it's likely that every Windows application will make some use of OLE's component approach.

OpenDoc, on the other hand, is multiplatform by design.

Although not yet generally available, early releases run on a variety of systems, including OS/2 and the Macintosh. Organizations that plan to remain heavy users of a diverse set of operating systems ought to take a serious look at OpenDoc. Organizations that also plan to remain heavy Windows users, however, should also plan for dealing with integration issues between OpenDoc and OLE.

Distributing Components

In a client/server world, applications built from components that run on only a single system aren't very interesting. But distributing components requires facing the same set of problems described above because some infrastructure must exist for providing directory and security services in a distributed environment.

Microsoft plans to provide this with Network OLE, a set of distributed services for OLE components scheduled to ship sometime next year. While the primary goal is to work well in the world of Windows and Windows NT, Microsoft appears concerned with ensuring interoperability between Network OLE and DCE. In fact, Network OLE uses DCE's remote procedure call protocol. In addition, Microsoft says it will support DCE security as an option and probably include some access to DCE's directory service as well.

OpenDoc also has plans for future interaction between distributed components. In much the same way that OLE technologies are based on COM, OpenDoc is based on IBM's System Object Model (SOM).

SOM supports distribution today, and the announced plan is to use this for future distribution of OpenDoc components. Distributed SOM at the moment has only rudimentary security and directory services, however.

Summarizing the Choices

While some degree of diversity is inevitable, there are two major avenues down which an organization can walk. One is to willingly remain a heterogeneous, multivendor shop, a world with a diversity of client and server operating systems, something like DCE for distributed services, and the explicitly multiplatform OpenDoc for component software.

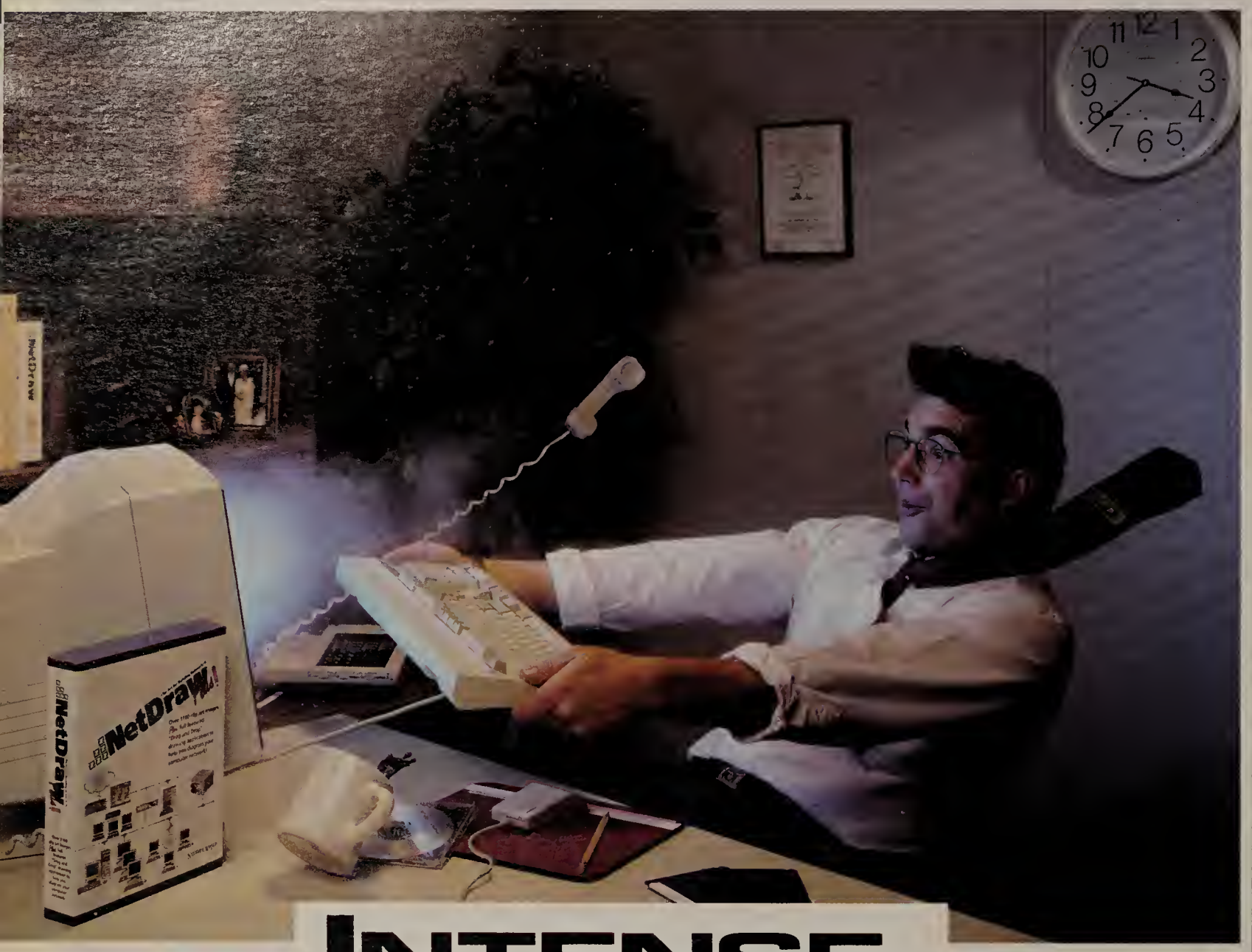
The other is to surrender to the Microsoft embrace: Windows and Windows NT on clients and servers, eventually Network OLE for distributed services, and OLE for component software.

The first choice is, in some ways, the default —it will flow naturally from what's out there today in a typical organization. The second choice probably leads to a much simpler environment, one in which a single vendor provides a unified set of critical infrastructure services.

But this second choice is certainly not risk-free; after all, betting one's business on the reliability of Microsoft's software is bound to induce a few sleepless nights. Still, for many organizations, it holds an undeniable attraction.

Infrastructure choices can't be made piecemeal. Each influences the others. And while heterogeneity is sometimes required, it is always expensive. Its existence today owes more to historical and organizational factors than to true technical requirements. Controlling it is not easy, but neither is it impossible. A simpler environment is its own reward. ■

Chappell is principal of Chappell & Associates, an education and consulting firm in Minneapolis. He can be reached at (612) 922-5784.



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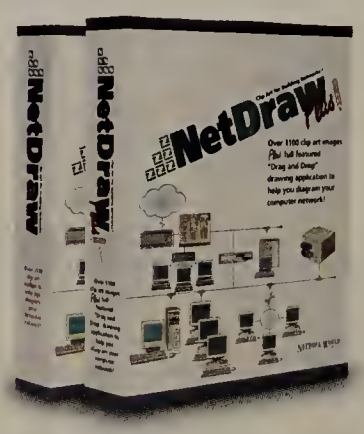
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Memo to IBM: Please don't blow it this time

BY JEFF HELD

The IBM-Lotus merger looks good on paper, but will differences in personalities and cultures undermine its potential?

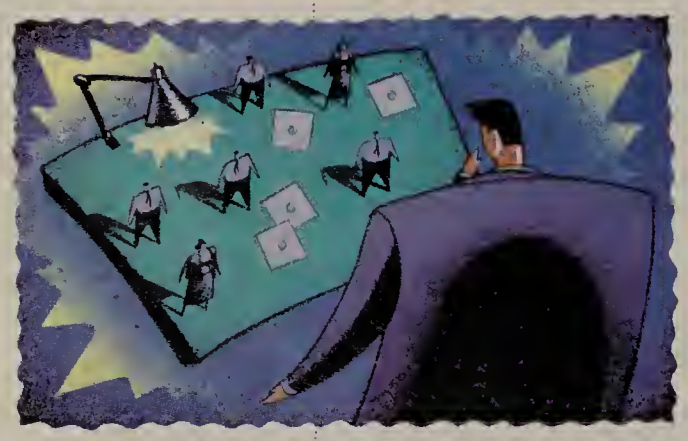
Unless you've been living in a cave (in which case, you don't need groupware), you have undoubtedly followed IBM's acquisition of Lotus Development Corp. My general reaction to this not unexpected event is very positive, but I question whether IBM can pull it off.

IBM/Lotus has synergy. Lots of it, in theory. Lotus brings a set of network-, electronic mail- and groupware-enabled applications that could be the missing piece to IBM's enterprise strategy. IBM brings enterprise products, networking, access to the legacy environment and existing corporate relationships. Together, this should be a combination that no company, not even Microsoft Corp., can match.

What They Get

In short, Lotus gets money and access. IBM can provide help in two areas where Lotus has been struggling: product development funding and access to major accounts.

Lotus was getting pummeled by Microsoft in the suite market because Lotus simply didn't have enough funding to keep up in the suite business and still pour money into Notes. Given the choice, Lotus chose to keep backing Notes, and saw its market share in the suite business slide.



Access to major accounts, and particularly the "glass house," also is key to Lotus' success. Notes is an enterprise product, and it needs to be centrally managed like other such products. The central IS organizations in major accounts are the logical place for that to happen, but Lotus didn't have sufficient access there. IBM owns the glass house, so it is already there.

For its part, IBM gets decent desktop applications, Notes and some real live OS/2 apps. For some reason, IBM has been unable to produce competitive desktop applications. (Remember OfficeVision? How about DisplayWrite?) Lotus' SmartSuite is comparable to other office suite products, and it's designed to work with Notes and E-mail. Not only that, it supports OS/2, so IBM finally has a mainstream desktop product suite for OS/2.

In Notes, IBM gets a unique product that currently has no direct competitor. And it should do even better with IBM's sales and marketing muscle behind it. The really intriguing aspect is whether IBM can integrate Notes into its enterprise product lines. If done well, it would give IBM something Microsoft can't touch.

So What's the Problem?

The history of IBM's acquisitions and investments in technology is not a happy story. In 1984 IBM acquired Rolm, which was then the technology leader in digital switching products and a fast growing, successful company. Five years later, IBM sold the remains of Rolm to Siemens at a substantial loss. The problem? Culture. Rolm was a classic California technology company: laid back, no dress code, Friday beer bashes, a cool place to work. IBM was none of the above. The result was inevitable.

A few years later, IBM entered into a partnership with MCI Communications Corp. and took a substantial equity stake in the company. As far as I can tell, this partnership produced nothing of value to either partner, and IBM subsequently sold its stake (for a profit). The reason? Culture again. MCI was a fast-moving, gun-slinging, butt-kicking kind of place where decisions got made quickly. There's a pattern here, and it's disturbing.

So now we have IBM acquiring Lotus, a classic, politically correct, "People's Republic of Cambridge" company whose culture attracts creative people and results in great products. I know IBM has changed, but has it changed enough? What about Lotus? It needs to change too, since some things at Lotus clearly weren't working. IBM also has to walk a fine line between changing Lotus too much and not enough. There must be some changes at Lotus to work effectively within IBM, especially in the marketing area. On the other hand, too much tinkering by IBM will kill morale and cause key Lotus people to leave.

So what will happen? I give this merger about a 70% chance of working out. I think everyone involved realizes there's just too much at stake to do anything stupid. For both companies, it's really their last chance in the desktop market. The wild card is human nature: Egos, personalities and culture will ultimately make or break this deal.

E-Mail or Groupware?

One of the most common questions I'm asked by prospective groupware users is: "How is groupware different from electronic mail?" One of the best examples I use to answer that question is to consider a hypothetical situation in which five people need to discuss an issue remotely.

In this situation, whoever starts the discussion needs to send four E-mail messages to the other members of the group. Each recipient then needs to send four E-mail messages to respond, so that all members of the group can see everyone else's response. After one round of discussion, 20 E-mail messages are generated, and each successive round of discussion generates 20 more. What makes it really impossible is that the messages aren't threaded, so recipients get them out of sequence and have no way to figure out which message is a response to which other message.

In an E-mail discussion between multiple people, it is nearly impossible to discuss a complex issue and reach a resolution.

Groupware products such as Notes or the various discussion board products deal with the two main problems described above. First, each response can be seen by all participants without the sender having to address it. Second, most groupware products support threading, so everyone can clearly see the hierarchy of discussion and responses. These features make the process of group discussion and decision-making possible using technology. ■

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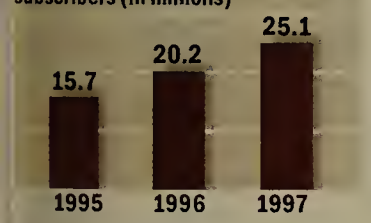
Briefs

■ **NaviSoft, Inc.,** *an America Online, Inc. company, has begun offering a* **Web page design and hosting service** *for business customers. The home page service costs $14.95 per month with a onetime setup fee of $99 that includes a copy of the NaviPress authoring tool. A personal domain name and 50M bytes of storage space cost $99 per month, with a $199 start-up fee. Contact NaviSoft at (800) 879-6882 or visit its Web site at www.navisoft.com.*

■ *Research firm* **Dataquest, Inc.** *predicts that the* **subscriber-based on-line services market** *will continue to grow despite the increasing popularity of the World-Wide Web. Dataquest said subscribers will be willing to pay for on-line services, including America Online, CompuServe, Prodigy and newcomer Microsoft Network, because of quality of content, ease of use and convenience.*

ON-LINE SERVICES UPBEAT

1995 worldwide forecast of on-line subscribers (in millions)



Although the subscribers of on-line services will increase by nearly 10 million over the next two years, total market revenue will not increase as quickly due to price competition.

SOURCE: DATAQUEST, INC., SAN JOSE, CALIF.

■ **VeriFone, Inc.,** *a manufacturer of merchant point-of-sale equipment, last week announced it intends to* **purchase Enterprise Integration Technologies, Inc. (EIT),** *an Internet electronic commerce software developer and consultancy. VeriFone is forming its Internet Commerce Division managed by VeriFone Vice President Roger Bertman. The new division will develop software based on industry standards, such as the upcoming Visa/MasterCard security specification, to sell to retailers, banks and back-end processing suppliers.*

Adobe Acrobat swings into multimedia, Web

By Ellen Messmer
Mountain View, Calif.

Adobe Systems, Inc. next month will ship an upgrade to its Acrobat electronic publishing software that will let users create links to the Web or add audiovisual segments to documents.

The Adobe Acrobat 2.1 tool kit will come with an application called Weblink that lets authors embed a URL within a document written in Adobe's Portable Document Format (PDF).

Any Web browser that uses the Weblink utility, which is available free from Adobe's Web site, will be able to access PDF files from across the Internet. And as part of Adobe's free Acrobat Reader 2.1 for viewing PDF files, Weblink will let users follow connections it created.

The Web's HyperText Markup Language (HTML) has engendered the Web publishing explosion by providing a common format for browsers to read text, but it falls short in the area of graphics, said John Dawes, Adobe's product manager.

"HTML does not display charts or tables very well, so you can't flow text around a graphic in HTML," he said. "If you want to publish on the Web, it will be more graphically rich if you can publish in PDF on CD-ROM and have links to your Web page."

Adobe's Weblink for PDF files is bundled with the Adobe Acrobat Exchange 2.1 package for Macintosh, Windows or Unix. Acrobat Exchange 2.1 is intended for integrating spreadsheets, text and graphics into PDF format for display on CD-ROM or servers.

Weblink is also included in two other new Acrobat 2.1 packages: Acrobat for Workgroups, which comes with a 10-user license, and Acrobat Pro for professional publishers using Adobe's Pagemaker or Quark, Inc.'s Express page layout program.

Netscape Communications, Inc. plans to incorporate Adobe's reader into its Web browser.

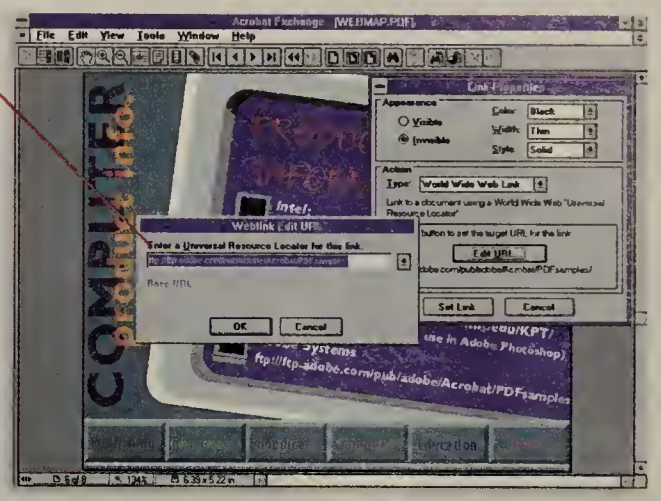
Adobe Acrobat 2.1 also contains an authoring tool called Movie for incorporating multimedia elements into PDF files. The Movie tool will let audiovisual material be played back on any computer supporting Apple Computer, Inc.'s Quicktime or Microsoft Corp.'s Audiovisual Interface.

"The new Weblink feature is really important since use of the Web is increasing," said Steve Semorile, a systems analyst at Chevron Corp., which uses Acrobat software for distributing information such as material safety data sheets to contractors and vendors. "Publishing on the Web in PDF would be a desirable way of distributing information with minimal reformatting."

Users storing Adobe documents on CD-ROM have found that the Acrobat search engine is limited to a search of a single file. But Acrobat Exchange 2.1 viewer will be able to perform full-text searches of an entire CD-ROM.

Adobe Acrobat Exchange 2.1, available for Windows or Macintosh, costs $195. Acrobat for Workgroups 2.1 is priced at $1,595. The Windows and Macintosh versions of Acrobat Pro 2.1 cost $595, while the Unix versions, available in October, are priced at $1,895.

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Acrobat users can embed a URL within a PDF file to connect the document to the World-Wide Web using a Web browser.

BUSINESS SPACE

HTML, commercialism and socialism

From: Ronald J. Peterson
To: Mark Gibbs

I don't understand why you feel HTML is a quasi standard. HTML is an instance of SGML, which is a real standard.

There are good reasons to have an appearance-independent format for documents. The page size may be different, with some people having small monitors, or a person may be visually impaired.

The purpose of publishing on the Web is to inform, not sell. Businesses that try to make money without delivering a product are soon out of business.



Mark Gibbs

From: Mark Gibbs
To: Ronald J. Peterson

Sure, SGML is a "real" standard. It is feature-rich, very complex and has a learning curve that makes Mount Eiger look like a pimple.

Au contraire, HTML is fairly poor in features, very simple and has a learning curve that wouldn't defeat a demented bee. It is also a "real" standard, but only if you accept a limited scope to its applicability.

Standards are "real" inasmuch as they are precise within a defined context to a given depth of detail. That is to say, if you define a bolt as "a device to fasten two things together," that's great as long as that is the precision required.

However, there are many situations where you have to say something much more specific like "fix Thing A to Thing B using a I-inch long, anodized aluminum bolt with a castellated nut tightened with a torque of such-and-such."

My characterization of HTML as a quasi standard is based on pragmatic issues of what we want to do with the Web. What we want to do is tell stories, paint pictures, convey ideas, and stimulate thought and emotion. Sure, you can tell a story using only left-justified 12-point Courier, but you have a limited palette to work with. (That's why smileys have become so popular in electronic mail.)

If you consider the scope of HTML to be just content and structure, then HTML is a real (precise) standard. Otherwise, if you think rendition is at all important, then HTML is a quasi standard because, in the broader context, it is imprecise.

As for rendition on different monitors or supporting the visually impaired, the onus of support should be on the creator of the Web page. If I don't care about people using VGA monitors, it is my concern. Enforcing the ability to display Web data by restricting the scope of HTML sounds suspiciously socialist. You write that the "purpose of publishing on the Web is to in-form, not sell." Who says? I suppose that is true if you want to limit the scope of the Web as you do the scope of HTML, but reality and the marketplace disagree.

You see, at the heart of the arguments over whether HTML should be rendition-independent and whether the Web should be "informational" is simply the facing-off of those who don't want to see a commercial Web against those who do.

Those who think that the Web and the 'Net should have a higher objective, go ahead, write informational Web documents that can be rendered on any type of machine to reach the widest possible audience. Those of us who are interested in electronic commerce will applaud and support you. The 'Net is a big place, and there's room for both capitalists and socialists.

Thanks for the feedback.

Gibbs is a writer and consultant in Ventura, Calif. Contact him at mgibbs@gibbs.com or at (800) 622-1108, Ext. 504.

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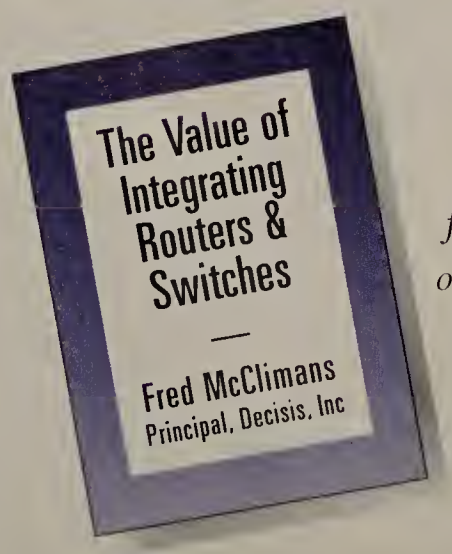


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Technology Update

Keeping Up with Network Technologies and Standards

NETWORK HELP DESK

Network World *tracks down answers to your questions. Please submit them to Dana Thorat via phone at (800) 622-1108, the Internet at djt@world.std.com or fax at (508) 820-1103.*

Is there a Web browser for IBM's VM/CMS?

Randy McCoy, Rolla, Mo.

There are a few that you can download from the Internet, says Wayne Spivak, president of SBA.NET.WEB, an Internet and Web consulting firm in Bellmore, N.Y.

One is British Columbia Systems Corp.'s Charlotte, a full-screen Web browser for 3270 terminals and emulators linked to a VM/CMS host. Use Gopher to access the file at gopher://p370.bcsc.gov.bc.ca/11/vmtools. Then there is WWW Distribution for VMS, available at http://delonline.cern.ch/disk$user/duns/doc/vms/distribution.html and Mosaic for VMS, which can be found at http://www.w3.org/pub/bin/vms/.

Spivak can be reached on the Internet at Waynes@netcom.com or by pointing your graphical browser at http://www.ronin.com/SBA.

Can you tell me where on the Internet I can find standard token-ring cabling specifications?

Louis Breit, New York

You can try visiting the IEEE and the ANSI Web sites, says Howard Bleiwas, a staff consultant for EJR Computer Associates, Inc., a consulting firm in Hoboken, N.J. The IEEE's Web address is http://www.ieee.org. ANSI's Web address is http://www.ansi.org.

If you can't get a full copy of the token-ring standard ISO 8802-5 (also known as ANSI/IEEE 802.5) from those sites, you can get information about how to order a copy. Or just call IEEE at (800) 678-4333 or ANSI at (212) 642-4900.

For additional information on token-ring networks, look at The University of New Hampshire Interoperability Lab's Token Ring Consortium home page at http://www.iol.unh.edu/consortiums/tokenring/tr_consortium.html.

The consortium focuses on the development of technology and testing procedures that ensure token-ring products operate and interoperate properly in complicated heterogeneous networks.

ATM standard promises switch interoperability

The ATM Forum's Private Network-to-Network Interface will provide switched virtual circuit routing across a WAN.

By Jim Nielsen

Asynchronous Transfer Mode undoubtedly has begun taking root in corporate nets, but it will not really blossom until users are assured applications are able to flow from start to finish without getting mired by switching systems that cannot interoperate.

The ATM Forum is addressing this issue in the Private Network-to-Network Interface (PNNI), a dynamic routing protocol that will enable users to build multivendor, interoperable ATM switching networks. The interface will be used between individual or groups of private ATM switches.

Since ATM is connection-oriented, links between sources and destinations need to be established to allow data transport from switch-to-switch over the most appropriate paths available. PNNI has many features in common with traditional routing protocols that operate today in the shared media worlds of Ethernet and token ring, but the role the protocol will play in switched networking demands that it support a much richer set of capabilities.

PNNI will allow different vendors' connection management systems to communicate and to provide switched virtual circuit (SVC) routing for switching systems that may span thousands of switches. (A switching system is a set of one or more switches that act together and appear as a single switch for the purposes of PNNI routing.)

Peer relationship

Like Open Shortest Path First (OSPF), PNNI is a hierarchical, link-state routing protocol. It has two fundamental objectives: Distribute topology information between switches so that paths can be calculated between network endpoints, and extend the User-to-Network Interface signaling protocol to allow capabilities such as alternate routing on link failure.

Without the hierarchical nature of PNNI, every ATM switching system would have to maintain a complete picture of the total topology, including every physical link, and the reachability information for every node in the network. In what would be a tedious process for large corporate networks, connections between switching systems would have to be implemented as static routes.

The PNNI hierarchy is implemented through the establishment of peer groups, or clusters of switching systems. Nodes within the peer group exchange information with each other so that each member maintains an identical view of the group.

Switching systems are logically organized through peer-group identifiers, which are assigned upon configuration. Neighboring nodes query each other via a "hello" protocol to determine whether they are in the same peer group. If the identification numbers match, they are.

Topology information is propagated using PNNI topology state elements, which contain characteristics of logical links and nodal conditions. Peer-group members will have complete information concerning all other switches within that group and only summary information regarding other network nodes. A border node will have at least one link that crosses the peer-group boundary.

Quality service

For each connection request, a path is computed based on information stored in the node's topology database together with the connection's traffic characteristics and Quality of Service (QoS) requirements. QoS is the ability to guarantee a connection particular parameters, such as Maximum Cell Rate, Available Cell Rate, Cell Transfer Delay and Cell Loss Ratio.

As an example, imagine a 30M bit/sec MPEG-2 videostream that must be transported over an ATM network. The PNNI protocol must find a path that can support not only the bandwidth of the connection, but also the latency constraints of video. This must be the case for all links in the path along which the video will be carried.

PNNI provides this QoS across an entire multivendor net of switching systems. When a connection request is made, PNNI will try to route the connection on the preferred path. Along the way, each switching system performs connect admission control to ensure the QoS guarantee can be maintained.

In the event of a connection setup failure, PNNI uses a crankback mechanism to partially release a setup in progress. The connection request will be rolled back to an alternate switch.

In addition to supporting QoS parameters, PNNI is designed to have strong scaling potential. Conceptually, the protocol could be used to support a single global net comprising millions of switching systems.

The scalability is achieved through the use of PNNI's hierarchical model, in which reachability information may be summarized between peer groups. OSPF has two-level hierarchical capability. Compare this to the more than 100 levels provided in PNNI.

In an ATM network consisting of multiple switching systems, PNNI will be the industry standard protocol to implement the required SVC routing.

In the short term, PNNI Phase 0, or Interim Interswitch Signaling Protocol (IISP), will provide a rudimentary level of interoperability.

The ATM Forum completed IISP, which comes with the overhead of manually configured static routing, in December 1994. Vendors are now beginning to support it in their switches.

PNNI Phase 1, now in draft form, is scheduled for completion this year. Implementations are likely to come in the second and third quarters of 1996.

There's already movement afoot to extend the capabilities of PNNI to networks that comprise ATM switching systems and existing routers. Known as Integrated PNNI (IPNNI), this extended protocol would allow legacy routers to participate in the PNNI peer-group system and take advantage of the inherent scalability of PNNI.

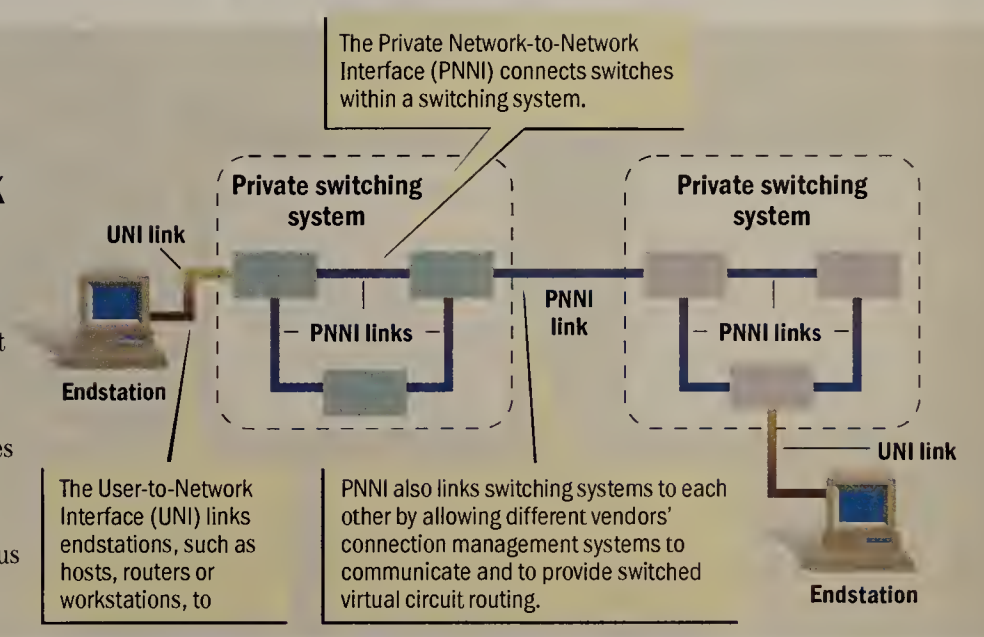
IPNNI would replace redundant frame-only routing protocols such as IGRP and EIGRP, allowing a single view of the switched and legacy parts of the network. This approach promises to allow the most efficient selection of appropriate paths through heterogeneous networks.

Nielsen is market development manager for switched internetworking products at Bay Networks, Inc. in Santa Clara, Calif.

UP CLOSE

ATM network interfaces

The ATM Forum has standardized on different interfaces for enabling interoperability between disparate network devices and the transmission of applications over multivendor Asynchronous Transfer Mode networks.



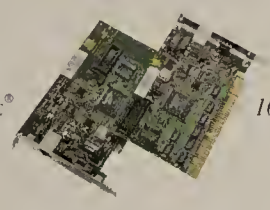
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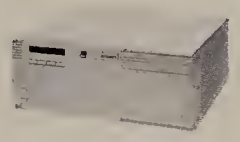
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EDITORIAL INSIGHTS

DCE is coming of age

Having had my fill of Windows 95, I spent some time last week at the OSF DCE User & Developer Conference in Boston and am here to report that DCE is not only alive, but maybe even well.

Customers were there in force, extolling the benefits of the Distributed Computing Environment to standing-room-only audiences in conference sessions, lunch gatherings and hospitality suites.

Users representing organizations including Motorola's semiconductor unit, EDS, Bell Northern Research and MCI told how DCE products were helping them marry mainframes, minis, Unix systems and more. They spoke of production applications that helped solve complex business problems.

To be sure, the picture isn't all rosy. Many of these same users told of issues that have yet to be ironed out. Administration has to be easier, and security remains a concern, although vendors such as IBM, Digital and HP used the show to tout forthcoming products with features from DCE 1.1 that address that area.



And DCE is clearly not for everyone, at least not yet. Only organizations with the most complex problems seem willing to take on the challenge; development cycles of 12 to 18 months are not uncommon.

"We don't even talk about DCE to the vast majority of PC and LAN folks because it scares them," said IBM VP Art Olbert.

But even the complexity problem is being addressed by the likes of Open Horizon, which makes Connection, a utility that purports to DCE-enable any client/server application. Last week, the company announced a program under which it will give your client/server applications access to DCE services within five days, guaranteed, or your money back.

"Nobody believes we can do it," said company President and CEO Nicholas Zaldastani. "We can do it in less than five days."

I hope he's sincere because customers need tools like Connection.

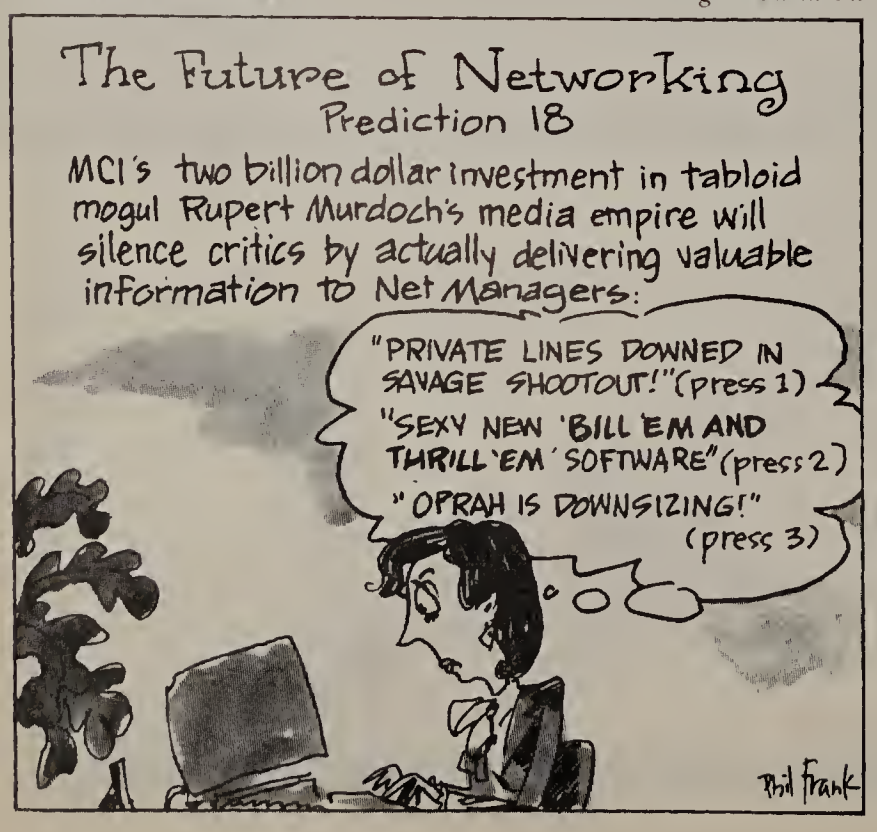
"We don't want a bunch of guys writing to the RPC level — it gets ugly down there," said Rolly Jarvis, who works for client/server and corporate information services at Caterpillar.

Still, users such as Jarvis have persevered. Now, through events like last week's conference, they are helping to spread the word about what they have learned. It just might be time for the industry to lend an ear because DCE is a good idea whose time is long overdue.

Paul Desmond, Features Editor *pdesmond@nww.com*

Teletoons

By Phil Frank and Joe Troise
guru@well.com



DISTRIBUTED COMPUTING

Move to distributed computing models puts database spotlight on net managers

As users move to distributed object computing, messaging, distributed transaction management and other sophisticated models for distributed computing, the role of the database management system will change. Early adopters of distributed technology report that they think about database products differently in their new environments from how they had in the past.



John R. Rymer

This shift in architecture will have big implications for network managers. It will mean that the burden of data integrity and reliability will shift from database administrators to network managers. It also will force network managers to look beyond their current concerns about network links and low-level protocols to application-level protocols and services. Ultimately, the shift will increase the importance of the network manager's role in creating and maintaining business applications.

Many organizations that adopted client/server technology during the early 1990s made a database management system the centerpiece of their architecture. In such a setup, all client/server interactions proceed through the database and require the intervention of the database server, such as an Oracle or Sybase relational DBMS. The database server manages the storage and retrieval of data, maintains job queues, coordinates network interactions, manages a directory of names and security information, and coordinates completion of transactions, among other services.

The major database products have gained their central position in user architectures primarily because of the marketing and sales prowess of the vendors — not for sound architectural reasons.

The result is an architecture that resembles the mainframe environments of old. Database servers become big, monolithic bundles of functions. The trend is toward a greater and greater concentration of functionality in database servers, too. Most database vendors are not breaking up their servers into more manageable components. Rather, they are introducing parallel processing architectures to better process a growing load of work.

Oracle, Sybase, IBM, Informix and other database vendors have become the most important suppliers of technology for the first generation of client/server architectures. However, the major database products have gained their central position in user architectures primarily because of the marketing and sales prowess of the vendors — not for sound architectural reasons.

In distributed systems, the concentration of multiple services into a single place — like a DBMS server — has proven to be inflexible and difficult to expand to meet growing user needs. A major goal of client/server architectures is to place units of functionality into separate servers. The result is easier maintenance of the separate parts as well as better scalability because there is no big bottleneck in the environment. Work is spread out across many services and servers.

I'm not saying that database servers aren't important — they are. However, in advanced distributed architectures, a database server plays a limited role.

In distributed application objects executing in memor need databases to periodical save their own states for use i future application session Without databases, objects ex cuting in memory die when th machine they are running on powered down.

However, the database is n the heart of the environmen That role is reserved for a Distr bution Service that manages conversations acro networks and the distribution of objects arour networks.

Distribution Service is usually an Obje Request Broker (ORB), a messaging engine or transaction monitor. These facilities are commu cations backbones; they intercede to configure t network machinery as required for objects exec ing in memory to interact. In fact, among the int actions that, say, an ORB manages, are requests objects for data storage services. When an obje needs to store its data state, it will ask an object th represents a storage service to help it do so.

Early adopters of advanced distri uted computing architectures ha found that it is better to separate t Distribution Service from the databa services. Why? These users ha encountered two problems when th placed one of today's database serv at the heart of their distributed obj environments. Both have had a l effect on performance.

The first problem is that toda database servers coordinate inter tions by reading and writing data disk. All interactions, in other wor require persistent transactions.

This is overkill for many obj applications. It is often unnecessary an object to record every change in state. Even when objects need record their state changes — to s port time-series analysis, for example — real-t transaction processing is often an inappropri way for them to do so. In these cases, objects n merely to reliably record their states at given poi in time. Conventional database processing, other words, does not suit many object systems.

The second problem concerns performance distributed systems. As I said earlier, today's d base servers have become large, complex ope ing environments. In distributed systems, la complex servers are performance bottlene They require too much overhead to interpret a then process a wide variety of service requests. T better approach is specialized servers.

Obviously, these ideas are unpopular with large database vendors. So be it. User experie provides ample evidence that making a datab the heart of a distributed environment won't sc We can only hope the database vendors listen to requirements of users and respond with appro ate distributed computing products.

Rymer is editor in chief of "Distributed Compu g Monitor," a monthly report published by Patricia Seyb l Group, Inc. of Boston. He can be reached at (6 7) 742-5200 or via the Internet at jrymer@psgroup.com

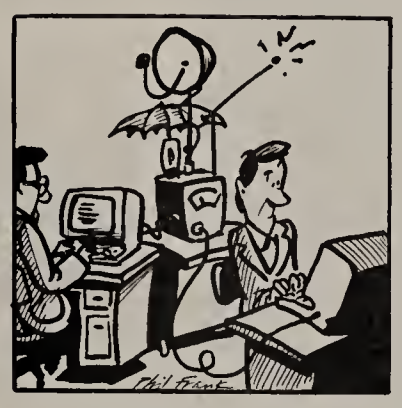
NETWORK FRONT LINE

Wait! Do you really need that link?

Bill Hancock

In the network business, you see a lot of silly things. Some of the more absurd are the extremes to which companies will go to get unnecessary network connections between systems.

Consider a recent customer of mine who wanted to enable four workstations in a workgroup to share two printers. The customer bought the printers and the necessary drivers, queuing software, protocol stacks, network modules and hub ports. The cost of the printers: less than $500 each. The cost of the network components and software to enable the workstations to share the printers: almost $3,700.



I've encountered many more examples of networking ludicrousness. One client spent $20,000 to hook up a $184 Okidata printer to service three people in a work area. Why? Because the cost for the printer came out of the client's budget, but the cost for putting the printer on the network came out of another department's budget.

There are times when putting in a network is the wrong thing morally, physically and financially. Another customer of mine had a site 100 miles from the main corporate office. The remote location was out in the weeds and the customer wanted to put in a network connection. Further research showed that about $300,000-worth of telephone equipment was needed to get everything hooked up. Why? So that payroll files could be sent from the main office to the remote site every two weeks.

Ever hear of FedEx and a floppy disk?

Then there are the users of network technology that I call the net-yuppies. These are the people who must have all the office widgets that any human could need. Electronic mail for about six E-mail messages a month. Word processing for one document a week. Scheduling software for a schedule that gets updated once a quarter. Give me a break!

Not everyone needs technological solutions, and those who ask for them the loudest are often those who use them the least. A tremendous amount of money is expended in the name of user productivity on technologies that are rarely used.

Last year, a scholar from the Boston area asserted that computer technologies did not increase productivity in the workplace. I had a hard time believing this, so I read a copy of the scholar's study and realized he was right.

In the past, a person took 2 minutes to respond to a memo by jotting a note at the bottom of the page and then returning it to the sender. Nowadays, the sender responds with a memo composed on a word processor, using the computer's thesaurus, dictionary and graphics software and a laser printer. This takes 30 minutes, wasting not only time but a great deal of resources in the process. Obviously, technology is not always the solution.

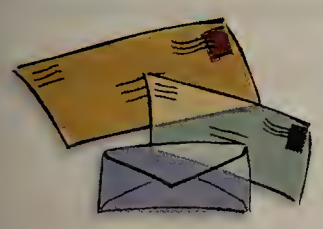
Common sense should be the first indicator when deciding whether to install a network. Not a study, not a massive committee meeting or an external consultant's report. Just a clear common-sense statement of why the network is necessary, why now is the time to install it and how it will improve the workplace. The network should start out small and grow.

In the meantime, while you are considering the above points, I need to answer my text-message pager. Which, coincidentally, is tied to my corporate mail router via my notebook computer with the cellular modem in it that allows me nationwide access on demand. Most likely, I will need to respond to E-mail or check something on my company's World-Wide Web server. Or I may need to use my personal digital assistant to send or receive a fax through the wireless network to which I am connected.

You see, while I do believe that not everything needs to be networked and that there is a time when networking is necessary, I also believe in going whole hog when that time comes.

As long, of course, as it makes sense.

Hancock, executive vice president of New York-based Network-1 Software and Technology, Inc., is a computer and network consultant, designer and engineer. He can be reached at (214) 606-8200 or via the Internet at hancock@network-1.com.



IN-BOX

Now on-line

In an editorial last year, *Network World* suggested ways for industry user groups to expand and succeed. Most of your suggestions dealt with educational opportunities, networking and enhanced relations between vendors and users — issues the Communications Managers Association (CMA) has addressed for many years. But one area the CMA had not entered then was moving the association into cyberspace.

That final objective has now been met. The CMA has obtained a World-Wide Web site and will offer a full range of information services. Interested parties can get information on the CMA's membership opportunities and educational programs, send membership applications and queries to our office, and scan the editorial content of the CMA's three publications — *CMA Review, CMA Update* and *CMA Telcom Express.* Our Internet address is http://www.cma.org.

Matthew O'Brien
President
CMA
Morristown, N.J.

Why switch?

Regarding your editorial "Free, for a price" (July 24, page 34): Internet access is only free for those who have someone else paying the bill. As long as the monthly bill for Internet use is comparable to bills for other providers' services, why should anyone switch from a provider such as CompuServe or America Online?

Until the Internet provides global access from any phone (mostly without tolls), guaranteed delivery of mail (or at least instant feedback on failure), and other services, private networks will play a significant role as Internet access providers.

Clifford Hersh
President
Move Resources, Inc.
Berkeley, Calif.

See **In-box,** *page 61*

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Jim Brown - Managing Editor
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Lee Schlesinger - Test/Reviews Editor
Phone: (508) 820-7416
Susan Collins - Associate Features Editor
Phone: (508) 820-7413; Fax: (508) 820-1103
Dana Thorat - Associate Features Editor
Phone: (508) 820-7451; Fax: (508) 820-1103
Kathy Scott - Assistant Features Editor
Phone: (508) 820-7489; Fax: (508) 820-1103

Contributing Editors
Daniel Briere, David J. Buerger, Mark Gibbs, James Kobielus, Mark Miller, Alan Pearce

Buyer's Guide Contributors
Mary Petrosky, **The Burton Group;** Tony Croes, Linda Musthaler, Josh Penrod, **Currid & Co.;** Mark Miller, **DigiNet Corp.;** James Kobielus, **LCC, Inc.;** Mike Marburg, **META Group Global Network Strategies;** Joel Snyder, **Opus One;** Daniel Blum, Gary Rowe, **Rapport Communication;** Daniel Briere, Christopher Finn, Christine Heckart, Mark Langner, **TeleChoice, Inc.**

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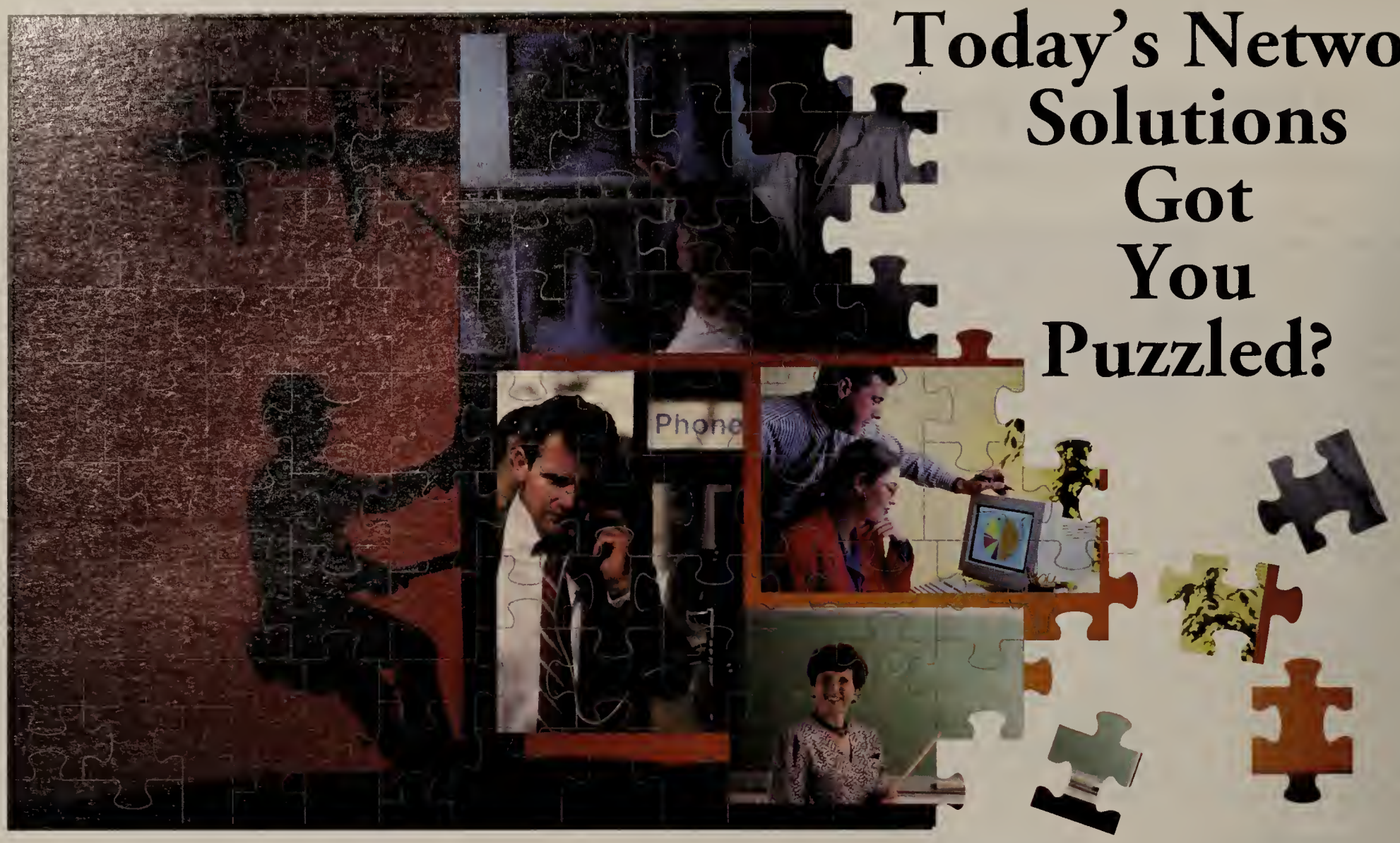
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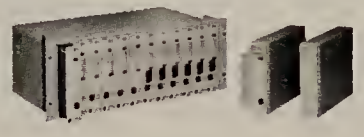
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Buyer's Guide

Which route for routers?



MARC YANKUS

By Mark Miller

As vendors relocate the function of routers, look for those devices to take on many new faces.

High-end routers are at a crossroads. The emergence of switches that can more efficiently segment LANs coupled with ATM technology that promises better wide-area performance has router vendors choosing one of two broad paths in developing future products.

One direction is to integrate routers — or at least the address lookup and path selection functions they perform — with Asynchronous Transfer Mode switches. Vendors going the other way are retaining traditional hardware designs but inventing methods that obviate the need to duplicate routing logic throughout the enterprise.

Part of what is driving the change is that routing logic can now be embedded in silicon on an Application Specific Integrated Circuit. That has paved the way for hub vendors to offer router modules that can compete with the most powerful standalone routers — those having more than 50 LAN and WAN interfaces; support for multiple routing, transport and bridging protocols; the ability to handle Systems Network Architecture traffic; and extensive network management. (For more details on hub-based routers, point your Web browser at http://www.nww.com/hubrouter.html.)

(The ability to stuff routing functions on a board is also transforming mid-range to low-end routers into commodity products that take many different forms, from inexpensive software to board-level offerings costing a few thousand dollars. This trend will be examined in a future Buyer's Guide.)

But the more significant changes at the high end are coming from vendors choosing their architectural direction for the future.

Now fast enough

Many of the high-end routers available today obtain the theoretical maximum throughout rates listed below.

Packet size	Throughput (K packet per second)		
Bytes	Ethernet	16M bit/sec token ring	FDDI
64	14.88	24.69	152.44
1.5K	.812	1.3	8.12

For more on performance, see story, page 57.

A VIVID picture

"Routing as we know it — which includes network layer intelligence to handle addressing, broadcast messages and other packet delivery functions — does not necessarily have to reside in a box," says Stu Aaron, product manager at Newbridge Networks, Inc. in Herndon, Va.

As part of its Video, Voice, Image and Data (VIVID) architecture, Newbridge has developed its VIVID ATM Virtual Router, which is, essentially, software that runs on the firm's VIVID Route Server workstation. The product determines the path cells must take through a network and feeds that information to VIVID Ridge and ATM switches, which then move the data.

VIVID Ridges provide connectivity to Ethernet or token-ring LANs. VIVID Ridges convert connectionless LAN packets to cells for transmission over a connection-oriented network. They can also function autonomously as Ethernet or token-ring switches. Essentially, VIVID Ridges are analogous to intelligent router I/O cards, with the ability to cache addressing information and forward some packets to their destination without further processing.

VIVID ATM switches provide the data transport function in a backbone internetwork and are thus

Continued on page 57

Routers

Company	Product	CPU	LANs		WANs		Routing protocol	Protocols routed (1)					SNA support	Throughput (K packet/sec)			Bridging	Mgmt.	Price range
		Max no.	Max. no of interfaces	A = ATM E = Ethernet F = FDDI FE = Fast Ethernet T = Token ring O = Other	Max no. of interfaces	Service Interfaces: A = ATM F = Frame relay I = ISDN S = SMDS SN = SONET	I = IS-IS OS = OSPF P = PPP R = RIP S = SLIP O = Other	AppleTalk	DECnet	VINES	XNS	Other	A = APPN D = Data link switching L = LLC conversion N = Native P = Poll spoofing S = SDLC pass-through T = TCP/IP encapsulation	Ethernet: 64/1.5K-byte packets	FDDI: 64/4.1K-byte packets	Token ring: 64/4.1K-byte packets	SR= Source routing SRT = Source routing transparent ST = Spanning Tree T = Transparent	RE = RMON Ethernet RT = RMON token ring S1 = SNMPv1 S2 = SNMPv2	
Advanced Computer Communications (800) 444-7854	Amazon	1	5	E, T	18	F, I, S, T-1	OS, P, R	✔	✔		✔		D, L, P, S	5/.6		3.5/.4	SR, ST, T	S1	$5,000-$19,485
Bay Networks, Inc. (800) 822-9638	Access Node family	1	2	E, T	3	F, I, S, SN, T-1	I, OS, P, R, O	✔	✔	✔	✔	✔	A, D, L, S	7/7		7/7	SR, ST, T	RE, S1, S2	$2,195-$5,795
	Access Stack Node	4	24	A, E, F, FE, T	40	A, F, I, S, T-1	I, OS, P, R, O	✔	✔	✔	✔		A, D, L, N, P, S, T	14.84/.812	97.79/2.79	21.74/.485	SR, SRT, ST, T	RE, S1	$6,300-$96,000
	Backbone Concentrator Node	13	52	A, E, F, FE, T	52	A, F, I, S, T-1, T-3	I, OS, P, R	✔	✔	✔	✔		A, D, L, S	14.5/NA	165/NA	21.5/NA	SR, ST, T	RE, S1	$24,000 $250,00
Cisco Systems, Inc. (800) 859-2726	Cisco 2500 Series	1	16	E, T	3	F, I, S, T-1	I, OS, P, R, S, O	✔	✔	✔	✔	✔	A, D, L, N, P, S, T	NA		NA	SR, SRT, ST, T	S1, S2	$2,195-$7,995
	Cisco 4000 Series	1	18	A, E, F, T	12	A, F, I, S, SN, T-1, T-3	I, OS, P, R, S, O	✔	✔	✔	✔	✔	A, D, L, N, P, S, T	NA	NA	NA	SR, SRT, ST, T	S1, S2	$6,700-$30,000
	Cisco 7000 Series	7	30	A, E, F, FE, T, O	40	F, I, S, SN, T-1, T-3	I, OS, P, R, S, O	✔	✔	✔	✔	✔	A, D, L, N, P, S, T	NA	NA	NA	SR, SRT, ST, T	S1, S2	$11,900 $135,00
Compatible Systems Corp. (800) 356-0283	RISC Router 3400R	2	1	E	4	F, I, T-1	P, R	✔	✔					14.88/.812				S1	$2,995
Cray Communications, Inc. (800) 367-2729	Cray System Center Routers	14	50	E, F, FE, T	44	F, I, T-1	I, OS, P, R, S		✔			✔	D, L, N, P, S, T	14.4/.61	30/NA	NA	SR, ST, T	RE, RT, S1	$3,095-$98,310
CrossComm Corp. (800) 388-1200	CrossComm XL IBN, XL2, XL5 family	1	1	E, T	2	F, I, S, T-1	OS, P, R, O			✔		✔	D, L, N, P, S, T	8/.4		8/.24	SR, SRT, ST, T	RE, RT, S1, S2	$2,550-ICB
	CrossComm XL10, XL20, XL80 family	32	32	A, E, FE, T	64	A, F, I, S, SN, T-1	OS, P, R, O			✔			D, L, N, P, S, T	14.88/.812		15/.496	SR, SRT, ST, T	RE, RT, S1, S2	$995-IC
Digital Equipment Corp. (800) 457-8211	DECNIS 500/600	16	14	A, E, F	48	A, F, S, SN T-1, T-3	I, OS, P, R, O	✔	✔			✔		14.77/.809	49.31/NA		ST, T	S1	$8,750-$55,000
Hewlett-Packard Co. (800) 533-1333	HP Router 650	5	16	E, F, FE, T	16	F, I, S, T-1	OS, P, R	✔	✔		✔			14.88/.812	14.88/NA	NA	SR, SRT, ST, T	S1	$11,900 $29,979
Hughes Network Systems, Inc. (301) 601-4299	Global LAN S7000	1	2	E, T	5	F, I, T-1	R, O		✔				D, L, N, P	NA		NA	SR, ST, T	S1	$2,950-$5,450
	Global LAN S8000	9	8	E, T	36	F, T-1	R, O		✔				D, L, N, P	NA		NA	SR, ST, T	S1	$8,950-$33,000
Hypercom Network Systems (800) 577-5501	IEN 1000	1	1	E, T	2	F, I, T-1	OS, P, R	✔	✔		✔		L, N, P	2.9/.124		2.9/.045	SR, SRT, ST, T	S1	$1,750-$8,000
	IEN 3000, IEN 5000 family	16	16	E, T	15	F, I, T-1	OS, P, R, S	✔	✔		✔		L, N, P	14.8/.62		14.8/.232	SR, SRT, ST, T	S1	$5,400-$40,000
IBM (800) 426-2255	IBM Nways 2210 Multiprotocol Router	2	1	E, T	3	F, I, T-1	OS, P, R	✔	✔	✔			D, L, P, S, T	4/.8		4/.48	SR, SRT, ST, T (2)	S1	$1,995-$4,381
	IBM Nways 6611 Network Processor	8	14	E, T	28	F, T-1	OS, P, R	✔	✔	✔	✔		A, D, L, P, T	11.95/.792		6.4/.48	SR, ST, T (2)	S1	$6,195-$60,47
Micom Communications Corp. (800) 642-6687	NetRunner Integration Router family	2	2	E, O	12	F	R, O						P, S	8/.337			ST, T	S2	$2,450-$9,900
Motorola Information Systems Group (508) 261-4000	6520 Multimedia Periphery Router	4	2	E, T	19	F, I, T-1	OS, P, R, S	✔					A, L, N, P, S	.75/NA		.78/NA	SR, SRT, ST, T	S1	$3,000-$8,000
NetEdge Systems, Inc. (800) 638-3343	ATM Connect	3	20	A, E, F, T	6	A, F, T-1	OS, P, R	✔				✔		17/.82	NA	23/.47	SR, SRT, ST, T	S1	$20,90 $50,00
Network Systems Corp. (612) 424-4888	BorderGuard	1	1	E	3	F, I, S, T-1	OS, P, R	✔	✔	✔	✔			6/.4			ST, T	S1, S2	$1,400 $3,900
	Enterprise Routing Switch	16	(3)	E, F	112	F, T-1, T-3	OS, P, R, O					✔	T	14.4/.825	100/3.05		SRT, ST, T (4)	S1, S2	$28,00 $268,0
	The Security Router	1	4	E, F	4	F, S, T-1	OS, P, R	✔	✔	✔	✔			12.5/.833	12.5/.833		ST, T	S1, S2	$11,99 $17,49
Newbridge Networks, Inc. (800) 343-3600	VIVID ATM Virtual Router	2	(5)	A, E, T	(5)	A, SN	OS, R							14.88/.75		NA	SR, ST	S1, S2	$50,00 $700,0
Penril Datability Networks (800) 473-6745	BRX 7400	1	16	E	18	F, T-1, T-3	OS, P, R, O	✔	✔					14.88/.63			ST, T	S1	$5,995 $16,35
Proteon, Inc. (800) 545-7464	CNX 500 Router	1	12	E, F, T, O (6)	12	F, T-1, T-3	I, OS, P, R, S, O	✔	✔	✔	✔	✔	D, L, N, P, S, T	NA	NA	NA	SR, SRT, ST, T	S1	$10,89 $34,90
	CNX 600 Router	2	20	F, T, O	20	F, T-1, T-3	I, OS, P, R, S, O	✔	✔	✔	✔	✔	D, L, N, P, S, T		NA	NA	SR, SRT, ST, T	S1, S2	$16,90 $56,90
	DNX Router family	1	2	E, T	4	F, T-1	I, OS, P, R, S, O	✔	✔	✔	✔	✔	D, L, N, P, S, T	NA		NA	SR, SRT, ST, T	S1, S2	$3,245 $5,245
	RBX 200/205 Router	1	1	E, T	2	I, T-1	I, OS, P, R, O	✔	✔	✔	✔	✔	D, L, P, S, T	NA		NA	SR, SRT, ST, T	S1, S2	$1,990 $3,790
RAD Network Devices, Inc. (714) 436-9700	OpenGate C4, C12 family	14	48	E, F, T (6)	80	F, T-1	R		✔				L, P, S	14.88/.812	35/3.1	20/.5	SR, SRT, ST, T	RE, S1, S2	$5,945 $84,60
	OpenGate MAR	3	8	E, T	8	F, T-1	R		✔				L, P, S	14.88/.812		20/.5	SR, SRT, ST, T	RE, S1, S2	$2,395 $12,60
Retix (800) 255-2333	RouterXchange 7000 Models 7221 and 7222	1	1	E	2	F, T-1	OS, P, R		✔					NA			ST, T	S1	$1,895 $2,550
	RouterXchange 7000 Models 7240 and 7260	1	3	A, E, T	6	A, F, I, T-1	OS, P, R		✔					14.02/.812		2.55/.485	SR, SRT, ST, T	S1	$2,995 $15,00
	RouterXchange 7000 Models 7500 and 7550	5	12	A, E, F, T	24	A, F, I, T-1	OS, P, R	✔	✔				D	14.88/.812	28.5/3.03	2.55/.485	SR, SRT, ST, T	S1	$11,10 $60,00
Symplex Communications Corp. (313) 995-1555	Direct Route DR-1	2	2	E	6	F, I	P, R	✔	✔	✔	✔	✔	T	3/.25			T	S1, S2	$2,999 $3,799
3Com Corp. (800) 638-3266	NetBuilder II	9	48	E, F, FE, T	24	F, I, S, SN, T-1, T-3	I, OS, P, R, O	✔	✔	✔	✔	✔	A, D, L, N, P, T	14.88/1.25	70/3	11/7.8	SR, SRT, ST, T (2)	RE, RT, S1	$10,61 $90,00
Xyplex, Inc. (800) 338-5316	Network 3000 Branch Office Router family	1	1	E	2	F, I, T-1	I, OS, P, R, O	✔	✔			✔		6/.33			ST	RE, RT, S1	$1,995 $5,195

Products highlighted by color were selected for the Short List.

Chart compiled by Kathy

Footnotes:

(1) Every product routes IPX and TCP/IP.
(2) These products also support translational bridging.
(3) This product has 84 Ethernet or 14 FDDI multimode ports.
(4) This product also supports FDDI encapsulation.
(5) Interface capacity is based on the number of networked components.
(6) These products also support Twisted Pair-Physical Media Dependent.

ICB = Individual case ba
NA = Not available

Continued from page 55

analogous to a router backplane. Multiple switches exist in a large internetwork, thereby optimizing the cell forwarding function and minimizing delay.

VIVID Route Server functions as a virtual router control card. It distributes routing table updates to all the VIVID Ridges, processes broadcast traffic and directs the response back to the appropriate node.

Finally, VIVID System Manager is used to monitor, control and troubleshoot the overall network. It performs traditional network management functions, such as component monitoring and configuration updates.

Newbridge positions its VIVID architecture as one that enables users to expand routing services on an enterprisewide basis without encountering the complexity of managing a distributed routing system. Another benefit Newbridge touts is that VIVID enables the network to be built with no more than one router hop between end nodes, instead of the multiple hops found in traditional router-based internetworks, which add to packet latency and throughput delays.

The VIVID architecture has been adopted by the ATM Forum as the foundation for the Multiprotocol over ATM (MPOA) framework. MPOA is a follow-on to the ATM Forum's LAN Emulation (LANE) technology, and the IETF RFC 1577, titled Classical IP over ATM. MPOA provides a means of emulating routing functionality over an ATM switching fabric without the need for physical routers and their inherent scalability limitations, which LANE and RFC 1577 encountered.

However, development of both MPOA and LANE is required to make a smooth migration from routed to switched ATM-based internetworks, says Mary Spada, principal at Global Growth Strategies, a consulting firm in Silver Spring, Md.

LANE 1.0, released in February, provides a bridged approach for enabling Ethernet and token ring to work transparently across an ATM network. MPOA defines how ATM traffic is routed from one virtual LAN to another, but it will take at least a year to complete the specification.

"The LAN Emulation vs. MPOA developments are just beginning to bubble. Although [these developments] are not yet at full boil, users that aren't careful can get scalded in the long run," Spada says.

CrossComm Corp. has taken a different path to integrating routers in an ATM world. The firm has inserted an ATM backplane into its XL80 and XL20 products, thus outfitting them to make routing decisions and perform ATM switching.

The backplane architecture features an ATM CrossPoint Matrix (CPM), which builds an internal ATM network within the router chassis. CPM simultaneously supports native ATM switching, LAN-to-LAN routing, switched virtual LAN (VLAN)-to-switched VLAN connections and LAN-to-ATM links.

Not so fast

Even with vendors moving to integrate routing into ATM environments and standards developing on the horizon, users are being cautious in making their move.

One user that doesn't want to get burned by a quick decision is Chuck Rush, global networking manager at McDonald's Corp. Rush is one of a new breed of network managers who work from inside a standards organization — the ATM Forum's Enterprise Networking Roundtable, in this case — to ensure that various vendors' products are interoperable before he installs them.

At its Oak Brook, Ill., headquarters, McDonald's currently has more than 2,500 users and 125 servers on three Fiber Distributed Data Interface rings. The key protocols are Novell, Inc.'s IPX, IP, Apple Computer, Inc.'s AppleTalk and IBM's Systems Network Architecture. The existing network comprises more than 150 Cisco Systems, Inc. 4000 Series routers, which will gradually be replaced with ATM switches.

Rush is treading cautiously into this new era. Given the current level of network growth, he knows his existing FDDI backbone will run out of capacity in a few years and, therefore, has begun transitioning to ATM.

In a pilot program, McDonald's is linking Bay Networks, Inc. EtherCell and LattisCell switches plus Cisco LightStream 2020 ATM switches over a mix of circuits that include 155M bit/sec Synchronous Optical Network (SONET) OC-3 and 622M bit/sec OC-12, as well as slower T-1 and T-3 links.

McDonald's selected Bay Networks' products because they were the only ones that could demonstrate a working version of LANE 1.0 and had proven interoperability with the Cisco switches.

"With all fairness to the vendors, ATM is brand-new stuff," Rush says. "We have had lots of vendors here testing their products, and they routinely have to modify their code as the result of those tests. Our current network has been measured at 99.9% uptime, and we are not willing to jeopardize our proven performance just for the sake of having a new technology."

Other users have similar concerns as they walk the fine line of holding off on investing in new technologies before the economics stabilize and waiting so long that their applications suffer.

Router architectures demonstrating some degree of ATM readiness — such as the availability of LAN or WAN interfaces, or an ATM backplane — can provide some of that assurance against investing in immediate obsolescence.

Joe Lyden, vice president of corporate network management at Scudder, Stevens & Clark, an investment counsel firm in New York, is among the network man-

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Performance report

Keeping internetworking vendors honest in their high-performance claims seems to have become a full-time job for Scott Bradner, senior technical consultant at Harvard University's Office for Information Technology.

As the manager for Harvard's Network Device Test Lab, Bradner oversees bridge, router and switch performance tests, and publishes the results on the Internet.

"Over the last few years, we have seen a greater vendor willingness to participate in these benchmark tests, and over time, the performance of the bridges, routers and switches has increased," Bradner says.

Harvard's testing looks at two key parameters: throughput, which is the maximum rate at which a device can receive, process and retransmit packets without losing any of them, and forwarding, which is the maximum rate at which packets can be received, processed and retransmitted, independent of packet loss. Both packet throughput and forwarding are measured in packets per second, for predefined packet sizes.

"In the last year, we have only seen incremental improvements in performance," Bradner says. "Most products are already at, or very close to, the theoretical upper limits. What is more interesting is the lack of variation between different vendors' architectures. According to the test results, quite different architectures produce approximately the same results."

▶ **Harvard University's performance test results** are available on the Internet via anonymous FTP, a Gopher server or the Web. Visit the ndtl.harvard.edu site and enter the /pub/ndtl directory.

OSI TRANSPORT

Bay Networks, Cisco, Cray Communications, Digital, Proteon and 3Com are among the enterprise router vendors with products that can route Open Systems Interconnection's connectionless network protocol.

NetworkWorld Short LIST

Routers

The Short List highlights products Network World *recommends you examine when purchasing routers. The products mentioned here support numerous LAN and WAN interfaces, as well as at least one high-speed option, such as Asynchronous Transfer Mode, 100M bit/sec Ethernet, Switched Multimegabit Data Service, Synchronous Optical Network (SONET) and T-3. They can also be integrated in an ATM switching environment. The criteria used to select these products reflect the needs of users with multivendor enterprise networks. Your needs may differ.*

Bay Networks, Inc.'s Backbone Concentrator Node started the trend toward high-performance and scalable enterprise routers, and now supports as many as 52 high-speed LAN or WAN interfaces, multiple Systems Network Architecture routing options and a Remote Monitoring (RMON) agent. Bay Networks has also taken steps to offer centralized routing functions in distributed ATM environments.

Cisco Systems, Inc.'s Cisco 7000 is considered the market leader and supports just about every known interface. The product also supports a rich set of routing and transport protocols as well as many SNA options and bridging support. Cisco has also spread its routing functions across multiple processors. For instance, it runs routing algorithms and maintains routing tables on one processor while another is used to make a routing, switching or bridging decision.

CrossComm Corp.'s XL80 has long been known for its fault-tolerant design. The product now draws attention for its internal ATM backplane, which provides a clear path to the high-speed future. CrossComm also has strong SNA routing capabilities and wins extra points for supporting Simple Network Management Protocol Version 2 and RMON agents.

The **DECNIS 500/600** anchors **Digital Equipment Corp.'s** enterprise Virtual Intelligent Switched Networks architecture, which distributes routing functions across various devices to provide a high level of fault tolerance and low latency. In addition to its distributed architecture, the product is a highly functional one with ATM LAN and WAN interfaces plus support for a broad range of transport and routing protocols.

As part of **Newbridge Networks, Inc.'s** Video, Voice, Image and Data (VIVID) architecture, the **VIVID ATM Virtual Router** is a model for running multiprotocol traffic over ATM networks and provides clear evidence of how legacy routing and ATM switching can coexist. In fact, Newbridge's technology is being used as part of the ATM Forum's emerging Multiprotocol over ATM specification, which defines routing among ATM-based virtual LANs.

3Com Corp.'s NetBuilder II has a robust multiprocessing architecture that splits routing functions between a central processor and ones on each of the interface boards in the chassis. This approach enables users to add processing power with each new interface board while maintaining peak performance. Strong SNA support, along with Ethernet and token-ring RMON agents, make the NetBuilder II shine a little brighter.

Continued from page 57

agers walking that line. Scudder's network is a collapsed backbone that utilizes Bay Networks wiring hubs. The firm currently has seven Bay Networks Backbone Concentrator Node routers installed in five locations, plus other mid-range and low-end routers for its small offices. Traffic includes TCP/IP, IPX and source route bridging packets. Typical of many financial organizations, Scudder has a parallel network running SNA/Synchronous Data Link Control.

Lyden's group has rearchitected its network to combine these parallel nets but is planning to stick with routers for the time being.

"In looking at ATM offerings from both equipment vendors and carriers, we felt that the current state of the art was not mature enough to meet our design criteria," Lyden says. Scudder's design team met with both AT&T and WorldCom, Inc., but reached the conclusion that ATM on the wide area is about two years away from practical implementation.

"I am certain that Scudder will eventually migrate to ATM for our wide-area network; however, frame relay and virtual private network offerings are presently available and hold the most promise in the near term," Lyden says. The firm's existing routers can access those services just fine.

Route services

Lyden and other users deciding to stick it out with routers do have some new ATM supporting architectures to investigate.

Cisco supports ATM switching using an ATM interface board — shipping since May 1994 — that slides into the Cisco 7000 Series chassis. This processor provides all of the segmentation and reassembly functions necessary to connect the ATM network to traditional LAN media.

"In the Cisco 7000, routing and switching functions are decoupled," says Dale Boehm, a Cisco product manager. One processing engine runs the routing algorithms and maintains the routing tables. A separate processing engine makes the multilayer switching, bridging or routing decision.

The advantage of this approach is that the control and security issues germane to routing are decoupled from the performance and scalability functions of distributed switching. Cisco maintains that processors supporting both of these key functions can be optimized for that application.

3Com Corp.'s NetBuilder II takes a different approach with its scalable multiprocessor architecture. Essentially, 3Com distributes the processing functions between the chassis and its interface modules.

The heart of the architecture is an AMD Co. 29000 Reduced Instruction Set Computing processor, which runs functions that are common to all modules, such as route calculation, data exchanges initiated by such routing protocols as Open Shortest Path First, and Simple Network Management Protocol agent operations. An 800M bit/sec bus, called Corebus, connects the central processor to interface modules, each of which has its own processor.

An Interprocessor Messaging System (IMS) runs across the Corebus and allows the modules to obtain next hop information from the centralized processor. In addition, the IMS synchronizes the information that modules maintain, such as network topology and routing tables, with the information in the centralized processor.

Modules that need additional horsepower, as dictated by the interface they are supporting, utilize their on-board processor. For example, a module can perform its own address analysis and forwarding functions, without the need to consume the resources of the central processor.

As new multiprocessing modules are designed, their forwarding functions will be moved closer to the end process, thus increasing the overall throughput of the system.

In addition, 3Com has addressed the issue of obsolescence by designing the multiprocessing modules to be interoperable with its older modules. If an older module is in the NetBuilder II chassis, it would rely on the centralized processor to perform all of the routing calculations.

Then there are the vendors such as Digital Equipment Corp. that are taking a distributed approach to routing, one in which the full routing function is incorporated within each switch, hub or other backbone device in the network. This enables those devices to determine the destination path for each packet on their own.

Digital has designed this distributed approach into its enterprise Virtual Intelligent Switched Networks (enVISN) architecture. Digital claims enVISN has several key advantages over the other schemes.

"The distributed nature of enVISN provides a fault-tolerant environment where performance and costs scale gradually as the internetwork grows," says Bill Burger, a Digital senior product manager.

Hughes Network Systems, Inc. has another twist. Its Global LAN S7000 and Global LAN S8000 utilize a Name Address Service (NAS) that enables them to perform routing functions for a variety of WAN devices, including X.25 or frame relay switches. NAS converts LAN packet addresses to an X.25 address or frame relay data link control identifiers for forwarding over an X.25 or frame relay network.

Some advice

Given the upheaval in the router industry and the competitive pressure coming from ATM, you can take one of four courses of action today, says Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C.:

- If your internetwork is primarily IP-based and there are no long-term plans for ATM deployment, continue to implement router-based internetworks.
- If the network requires distributed LAN switching to provide a virtual LAN environment, routing is required to affect the physical connectivity within the logical environment, but that routing function can be separated from the traditional router platform.
- If the network has a dominant protocol, such as SNA, consider a frame relay-based solution and assign a virtual circuit for each session between locations using routers with frame relay interfaces.
- If the requirement for multimedia or other high-bandwidth applications exists, consider an ATM switch-based net rather than a routed backbone. Some caution is advised here, however, as current ATM implementations are geared more toward campus-based networks, with wide-area solutions still on the expensive side.

"In the short term, there is no single solution," Dzubeck says. "But if network managers look over the horizon and plan for their future connectivity requirements, the picture becomes much clearer."

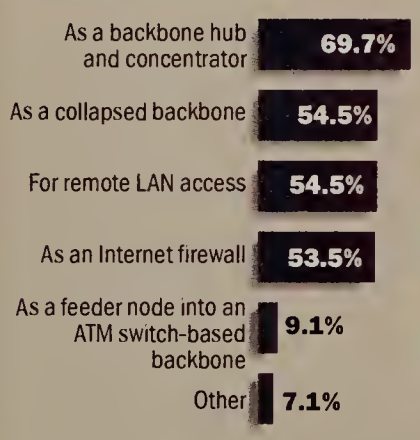
And that picture includes routing functions that have been embedded in many alternatives to stand-alone chassis.

Miller is a contributing editor and president of DigiNet Corp., a data communications engineering firm in Denver. He has authored seven books on LAN and WAN technologies, and is the instructor for Network World*'s upcoming Internetworking: Designing LANs, WANs and Broadband Networks seminar. He can be reached via the Internet at mark@diginet.com.*

Reader views on routers

Based on 100 interviews.

How do/will you deploy routers?



Key factors in router selection
(Based on a highest possible score of 5)

Packet throughput/ performance	4.42
Support for multiple routing protocols	4.30
Support for different LAN types	3.80
Multiple processors	3.50
Bridging of nonroutable protocols	3.42

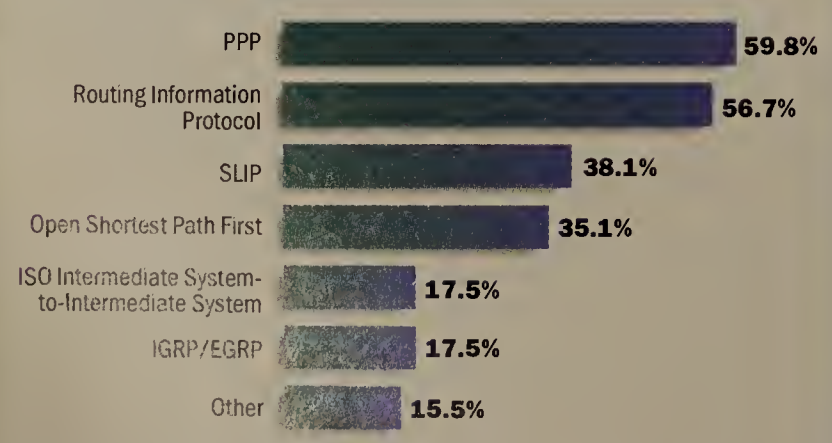
Most important ATM capabilities
(Based on a highest possible score of 4)

Ability to feed data from router to ATM switch	2.74
ATM LAN interface modules	2.54
Links to ATM wide-area data services	2.50
Internal ATM switching	2.36

Most important SNA capabilities
(Based on a highest possible score of 5)

TCP/IP encapsulation	4.25
APPN	3.07
Logical Link Control conversion	2.86
Data Link Switching	2.66
Poll spoofing	2.47

Which routing protocols do/will you use?



Focus Data, an independent market research firm in Framingham, Mass., conducted this survey. Focus Data specializes in gathering primary data from end-user organizations regarding their enterprise network environment and needs. For more information about Focus Data services, call Mona Dabbon at (508) 626-2556 or send E-mail via the Internet to mdabbon@focusdata.ultranet.com.

The basic stuff

As you examine the shifting architectures of routers today, don't forget some of the basics. When shopping for routers to place across the enterprise, first consider whether you should buy everything from backbone concentrators to branch office end nodes from the same or multiple vendors.

Then look at the number and type of LAN and WAN interfaces supported across the entire range of products. Areas that might bear special attention nowadays are whether a router supports new breeds of LAN interfaces such as 100M bit/sec Ethernet and whether it sports an ATM interface capable of operating at a minimum of T-1 speed.

A number of vendors have added these very interfaces to their routers. See the Buyer's Guide chart on page 56 for more details.

Manageability should also be a consideration, with support for the Simple Network Management Protocol Version 1 at a minimum.

A number of vendors, including Bay Networks, Inc. CrossComm Corp., Micom Communications Corp., Network Systems Corp. and Proteon, Inc., support SNMP Version 2. You should also weigh if the vendor supports the Remote Monitoring Management Information Base standard.

NetworkWorld Review

WINDOWS *Cleaning*

NetworkWorld TEST ALLIANCE

These three packages help you remove unwanted applications and files from Windows desktops across the enterprise.

By Steve Goldberg

If you want to see your desktop clearly, clean your Windows. And while it's hard to get good help nowadays, we found products from MicroHelp, Inc., OnDemand Software, Inc. and Quarterdeck Corp. that tackle the arduous chore of properly removing Windows applications, files and straggling remnants. All these products work not only on individual users' desktops, but also allow network managers to uninstall applications across the enterprise without having to visit every desktop.

Quarterdeck's CleanSweep and MicroHelp's Uninstaller take the same basic approach to cleaning the Windows environment. These easy-to-use tools search for files from a given application, burrow through directories looking for hidden pieces and destroy the components they find. Both have built-in safeguards for deleting and restoring data.

For networked applications, an administrator uses these applications to first remove the application from the shared network file service. The programs then place a decoy where the application used to be. When launched, this decoy removes application-specific information from the user's local disk or server directory.

The uninstaller features of OnDemand's WinInstall are a subset of a larger application whose main objective is electronic software distribution. WinInstall records all activity generated during a standard Windows installation session. An administrator can then play back this recorded file on other PCs to automatically install the same application. This file can also be used in reverse to remove the same application.

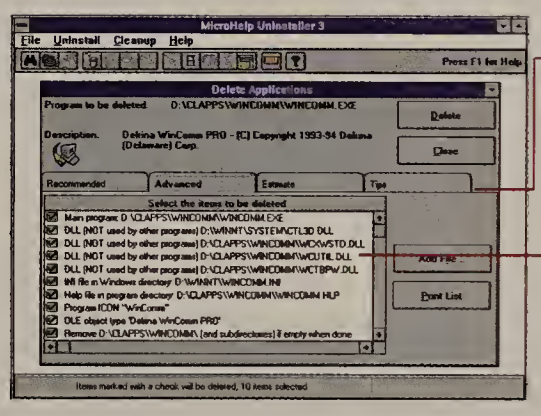


Figure 1: Uninstaller's tabbed interface clearly lays out the user's course of action.

Uninstaller recommends files and objects to delete.

Two products, one goal

Version 3.0 of Uninstaller for networks has an edge over CleanSweep 1.0 due to its features. In addition to having standard application deletion and archival functionality, the program enables a user to move an application to another location on a hard disk or transport it to another computer.

Installing both packages on our Windows NT server was a breeze. Once installed, the software can be accessed from the server console or at client workstations. Any client that can access the file server is licensed to use Uninstaller, but with CleanSweep, licensing is based on the number of users rather than server licenses. Depending on the number of users that need to install CleanSweep, price could become an issue.

Uninstaller includes a utility to monitor changes made to the Windows environment. For example, when a user attempts to delete an icon, rather than merely presenting the standard Windows prompt to confirm the deletion, Uninstaller intercedes by offering to remove the corresponding application.

Also added to the File menu is an option to install an application. Similar to the Program Manager File/Run command, this option lets Uninstaller monitor all changes made by any application's setup program. This information allows for later manipulation of the application, avoiding any guesswork concerning how it was installed. This is a feature that CleanSweep lacks.

CleanSweep's installation makes no changes to the Windows environment, outside of the addition of an .INI file in the Windows directory. The setup program even creates an icon to uninstall CleanSweep cleanly, a useful feature for nimble network managers with a fixed number of licenses.

Both applications have two main functions: application manipulation and disk cleanup. Application manipulation allows a user to delete, archive, move or transport an application. Delet-

Continued on page 60

NetResults

Product	Uninstaller 3.0	WinInstall 5.0	CleanSweep 1.0
Key findings	▶ Excellent interface. ▶ Abilitity to move and transport applications is top-notch. ▶ Excellent ability to locate "lost" files. ▶ Needs tighter integration in a network environment.	▶ Designed as an electronic software distribution tool for networks. ▶ Networkcentric design is big advantage for managers. ▶ Ability to schedule jobs is extremely useful. ▶ Does not have the ability to uninstall from scratch.	▶ Excellent and intuitive interface. ▶ Network decoy feature is implemented well. ▶ Does not integrate with Progam Manager to monitor software installs. ▶ Has lost the feature wars against Uninstaller 3.0.
Vendor	MicroHelp, Inc. 4211 JVL Industrial Park Drive, NE Marietta, Ga. 30066 Phone: (800) 777-3322 (404) 516-0899 Fax: (404) 516-1099 E-mail: 74774.55@compuserve.com	OnDemand Software, Inc. 1100 Fifth Ave., Suite 208 Naples, Fla. 33940-6407 Phone: (800) 368-5207 (813) 261-6678 Fax: (813) 261-6549 E-mail: 74347.137@compuserve.com	Quarterdeck Corp. 150 Pico Blvd. Santa Monica, Calif. 90405 Phone: (310) 392-9851 Fax: (310) 314-4217 E-mail: info@qdeck.com
Price	$299 per server	$495 for 50-user license $695 for 100-user license $1,295 for 250-user license	$49

Continued from page 59

ing an application removes it completely from the system, while archiving compresses all the pieces of an application into a single file. The user can then restore this file to the system at a later date.

Since both applications use compression, archiving can serve as a method of near-line storage. If, for instance, Microsoft Corp.'s Excel is used infrequently, it can be archived to a compressed file to save disk space.

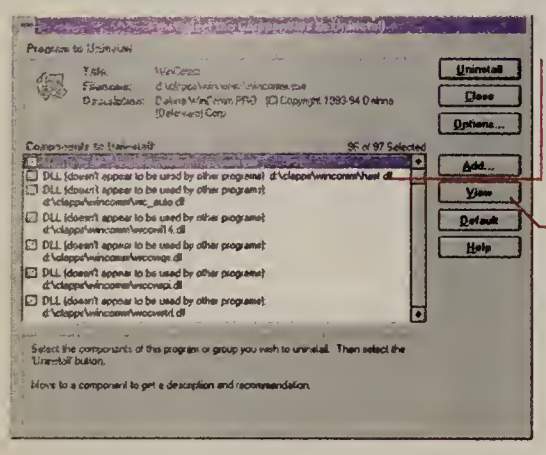


Figure 2: CleanSweep offers a similar screen to Uninstaller for selecting components to delete.

The View button lets users preview files before deletion, but CleanSweep offers fewer viewers than Uninstaller.

Both programs employ an algorithm that searches for interdependencies among files on a given system and builds a reference table of the links. Interdependencies are created when applications share, for example, a Windows Dynamic Link Library file. Uninstaller's algorithm is called SmartLinks, and the first time it runs is when Uninstaller is invoked; thereafter, it can be run manually as desired. CleanSweep's component is SuperLinks. It can be run manually or automatically in the background once a day at Windows boot time.

The reference files need to be updated one way or another when changes occur in the environment.

Once the table is built, users can dive into the products' friendly interfaces. A savvy user will need little time to learn how to use the software, but the manuals for both products are decent should problems crop up.

Uninstaller uses a tabbed interface to present a user with related information about a given topic. Deleting an application, for instance, presents a user with tabbed screens of recommended advanced tips and estimated usage (see Figure 1, page 59). Uninstaller clearly lays out what it will do for a given action.

The CleanSweep interface is straightforward, presenting users with four options: an uninstall and archive option, a system cleanup option, a choice to find unused files and an option to find duplicate files.

Each selection brings with it various options and choices for file archival and deletion (see Figure 2). The software does a good job at ferreting out information and presenting candidates for deletion that can save disk space.

Uninstaller can easily move an application to a different directory or drive, as well as update all related initialization or configuration files. This is a handy tool for network managers looking to bring a group of nonstandard PCs into conformity with standards — and one that CleanSweep lacks.

Transporting an application takes moving one step further. With Uninstaller installed on a network, an application can be compressed to a transport file from one system and restored to another. This provides a great way for users to share applications between a laptop and a desktop within the constraints of applicable licensing.

The disk cleanup function identifies obsolete or unnecessary files. These can be duplicates, files left over from a manual application deletion, help files and the like. Uninstaller presents lists of files that can be selected for removal. With the incorporation of technology licensed from Inso Corp., users can view files in any of 82 formats prior to deleting them.

CleanSweep makes some useful suggestions for deletion candidates, with accompanying textual descriptions indicating deletion ramifications. The descriptions are helpful to the novice, who might otherwise be leery of deleting anything with a "system" label. For example, unused fonts, wallpapers and screen savers are neatly presented for quick removal. The product includes only a few basic file viewers.

CleanSweep is extremely and appropriately conservative when it comes to deleting files. As with Unistaller, for any of the CleanSweep uninstall categories, users can first perform a trial run. Here, nothing is deleted, but a user can get a full report of the activity that will occur when the program removes an application. It also includes an accurate summary of the disk space that will be saved, which helps to determine if saving disk space is more important than going without the application.

The function net managers will be most interested in is the ability to remove net-based applications from a file server, along with references to the applications on user workstations.

In our test environment, we removed Lotus Development Corp.'s AmiPro 3.1 from a network installation of the entire Lotus SmartSuite. Both Uninstaller and CleanSweep cleanly removed AmiPro from the server, leaving a decoy in its place. Also left in place were files shared by AmiPro and the other Lotus applications, such as 1-2-3 for Windows. When we accessed the decoy by clicking on the regular icon on our desktop, we got a message informing us that AmiPro was about to be removed, even though we didn't have uninstaller software on our client machine.

It's easier to create a network decoy with CleanSweep than with Uninstaller. An administrator first selects a network application to delete. CleanSweep analyzes the application and displays the possible components to install. Since the application is located on a network drive, CleanSweep gives the option to create a network decoy. Once selected, a dialogue box is displayed for the administrator to enter a custom message.

The decoy procedure then prompts the administrator for the location of the CleanSweep installation. If CleanSweep is installed on an accessible public file service, a 15K-byte decoy is copied to user hard drives when the application is executed, removing the given application. If the software is not accessible to all users, the decoy consumes about 700K bytes of disk space on the user's hard drive. Both decoys are deleted when the deletion is complete.

We were pleased with the latest Uninstaller version, although we'd like to see tighter integration in a networked environment. The product would benefit from a node installation procedure for network node setup — today, icons must be added manually — and a better interface for creating decoys. We'd like to incorporate notice of who ran a decoy and when from the NetWare bindery.

Still, the utility performs an unglamorous job extremely well and saves time handling what was once a mundane chore — keeping Windows environments clean. And with its 82 built-in file viewers, users can easily view files prior to deletion.

CleanSweep, too, is a solid tool that performs its functions well. Application removal and archival were simple and complete. Its simple interface and network decoy features are definite pluses, but its lack of file viewers or ability to move or transport applications leaves it in Uninstaller's dust.

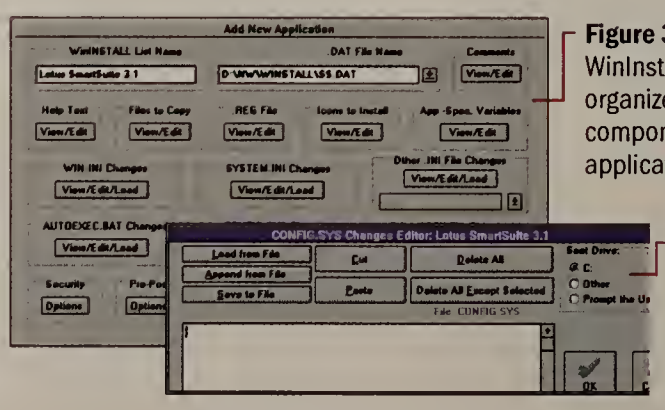


Figure 3: WinInstall logically organizes all the components of an application installation.

Users can view or edit changes made to system files.

WinInstall 5.0

WinInstall is marketed as an electronic software distribution tool for networked environments, with its uninstaller being only one of its many features. We found WinInstall 5.0 to be a must-have for any midsize to large Windows-based network environment.

While Uninstaller and CleanSweep are basically desktop products with some network functionality, WinInstall is a full-blown network implementation. In its most basic form, WinInstall captures changes made during a software installation. These recorded changes are then packaged and distributed to users, or they can enable an administrator to uninstall a given application.

Among features new to WinInstall 5 are the ability to perform a server-to-server installation, DOS client support and a data compression option that squeezes files to be transferred to user workstations during installs and files copied between servers. Each new feature further enhances WinInstall's grasp in a networked environment.

WinInstall's installation process creates icons for administration and user programs. The administration application helps define and manage the data files that are used to install and uninstall Windows programs. The software ships with WinInstall data files for many popular applications. With an application for which there is no data file or when a vendor releases a newer version of an application, use can easily create a data file wi the profile editor.

The WinInstall administ tion application is extrem intuitive, considering the re tive complexity of software. Tl administrator can create, e and remove WinInstall data fil from the main window. To ad new data file manually requi knowing all additions and mo fications that an application w make. Since that is nearly imp sible, WinInstall ships with a d cover feature.

Discover takes a snapshot relevant directories and dri prior to the administrator setti up an application. After runni the application's setup progra an administrator runs the disc ery program again for an "afte snapshot. The differences in t two snapshots are saved in a d file.

We liked this feature; it nea laid out all the clandesti changes made by the setup p gram in our test environme Once a data file is made by discover utility, it can be vie or modified by the WinIns administrator program.

We tested the discover feat with the Lotus SmartSuite se program. We created two Wi stall data files, one to install a SmartSuite client and the ot to install a shared LAN-based sion of the software. Creating data files was simple using cover, which we employed install and uninstall SmartSu on our client workstation.

The administration prog enabled us to view and mo changes made to system conf ration files, such as SYSTEM. or CONFIG.SYS (see Figure WinInstall can use custom ables in initialization files, rather than assuming that e user's Windows installa resides in C:\WINDOWS, Wi

See **Review,** *pag*

HOW WE DID IT

We created a two-node Ethernet 10Base2 test LAN consisting of an AT&T Globalyst 200 486/50 notebook running Microsoft Windows for Workgroups 3.11 and a Dell Dimension 60-MHz Pentium server running Windows NT 3.5. We used a network installation of the Lotus SmartSuite 3.1 to test the network features of each uninstaller, and the installation and uninstall features of WinInstall. We also removed a local installation of Derina Corp.'s WinComm Pro from our hard drives.

In-box

Continued from page 53

Illegal licensing

Regarding your story about the license restrictions Novell, Inc. has placed on its Windows NT Client for NetWare product (July 24, page 1): Two words best describe the situation — it's illegal.

Novell can never enforce a license that prohibits the licensee from competing with Novell. This is settled law, and the doctrine is called "misuse of copyright." Federal courts have ruled that license agreements that prohibit competition by means other than piracy attempt to improperly extend the copyright and actually make it impossible to prosecute license violators.

There is a seminal case from the U.S. Court of Appeals — Lasercomb of America v. Reynolds, in which the court excused an infringement based on the noncompete clause in the software license.

Cases all over the country hold to this case as the primary articulator of the misuse doctrine.

If Novell is smart, it will get that clause out of its license before someone challenges the company — and renders its copyright in this client software unenforceable.

John F. Tamburo
President
MBF Software Interests
Antioch, Ill.

False impression

As a beta test site for Arcada Software, Inc.'s Backup Exec for Netware 7, I was happy to speak with a *Network World* reporter about the software update, (July 31, page 25).

However, I was disappointed that the only comments attributed to me in the story were critical of the upgrade, giving the impression that I did not like the product.

The bulk of my comments praised improvements in the software. I like the strong support for Windows 95 (both registry and long filename backup), support for NetWare Directory Services, the ability to back up to several devices simultaneously, and the support for multiple clients under DOS, NetWare and Windows.

In addition to this, the software has proved itself to me where it counts by quickly recovering without errors those files my users have lost or deleted.

David Abrams
Engineer
Galactic Industries Corp.
Salem, N.H.

Review

Continued from page 60

stall can dynamically determine the active Windows directory. Administrators can schedule WinInstall installation jobs to run at a particular time or even send a complete job via E-mail.

One feature we particularly were fond of was the ability to specify options — which can include text to display or a program to call — to run before and after a WinInstall job.

WinInstall can also perform a systems check, making sure that a given system meets base requirements from minimum CPU to total memory. WinInstall checks in advance to make sure that a user has enough disk space to accommodate an installation.

The administration program lists all files that are copied or removed during a WinInstall session. That list can be manually updated to further customize an installation or removal process. The files to be installed can also be packaged into a single compressed file for easier distribution or even sent as an E-mail message.

WinInstall provides an indispensable tool for Windows network administrators, for both installing and uninstalling enterprise applications. ■

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 53.

Goldberg is a strategic technology planner who focuses on emerging technologies and workflow automation for a major accounting firm. He can reached at sgoldberg@vax.clarku.edu.

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Briefs

■ *From Sept. 11-13,* **Arthur Andersen & Co.** *and* **American Productivity & Quality Center (APQC)** *will sponsor the* **Knowledge Imperative Symposium** *in Houston.*

Chevron Corp.'s chairman, Ken Derr, and top managers from other Fortune 500 companies, including General Motors Corp. and The Dow Chemical Co., are scheduled to present their ideas about how to manage and share knowledge across the organization.

In addition, Symposium attendees will get a first look at Knowledge Management Assessment Tool, a software package for tracking how well they manage knowledge.

APQC: (800) 366-9606.

■ *An organization devoted to* **training and certifying** *workers in the fiber-optic industry has been formed.*

The nonprofit **Fiber Optic Association, Inc.** *is developing handbooks that will enable instructors to use a common methodology when teaching fiber-optic technology.*

The group also will attempt to establish a certification exam developed by fiber-optic test equipment manufacturer Fotec, Inc. as an industry standard. Fotec will provide initial administration guidance to the group.

Fotec: (800) 503-4237.

■ **Ferris Research** *has released a report that addresses how to build and implement corporate messaging directories.*

"Implementing Corporate Directories, a Planning and Management Guide" *includes technical advice gleaned from interviews with more than 90 directory planners and implementers, a series of case studies and a section that describes the strengths and weaknesses of 16 different products currently on the market.*

The report carries a list price of $1,495 but is available until Sept. 15 for $995.

Ferris Research: (415) 986-1414.

Assess resource allocation with a technology inventory

Understanding what's installed is the first step toward ensuring the most appropriate use of scarce resources.

By James Carlini

There are few things that are more frustrating than realizing an effort has been wasted or an opportunity has been missed.

This is no more true than when a competitor has the foresight to invest in a new network-based application that gives it the edge needed to gain market share, while you're spending too much to keep existing applications running.

What's called for here is a little target practice as you shoot to allocate your resources correctly. You've hit the bull's-eye when you've got your best and brightest people focused on fitting new or established technology into the strategic mix for a competitive advantage.

Your aim needs adjustment if you find that too much time, effort and money is going into propping up aging technology.

This technology target has five levels: embryonic, proven, accepted, safe and obsolete. All useful technology passes through each of these levels, some faster than others. Likewise, each technology starts out providing great return, then no return and having great risk, and finally, no risk at all.

This target gives managers a metric or yardstick that will help them more easily peg the types of technologies they have installed and help them understand what resources to allocate to each one.

Essentially, this information will help managers tell organization executives whether they are hitting the mark of spending the budget in the right places to get the maximum benefit.

Here's a rundown of the issues involved in investing in each technology:

■ **Embryonic technology** — This is definitely leading-edge stuff. Implementing this type of technology carries with it the most risk but has the potential for yielding the highest reward. Totally new and untried technologies fall into this camp, as do major revisions of existing software.

The more comfortable an organization is with using embryonic technology, the easier it is to swiftly adapt to it. However, the company has to be willing to shell out the dough needed to get people that bring the required depth of knowledge to the table.

■ **Proven technology** — This simply means a technology is ready to be broadly applied, but it will still require some significant investment and can be risky because it gained initial success on a limited scale. Therefore, it will require some highly savvy and somewhat expensive support personnel. Likewise, the potential for great gain is still there if the technology can deliver the competitive advantage you seek.

■ **Accepted technology** — Once a proven technology delivers on its promise, it reaches this level and requires you to educate many more staffers about its use and how to support it.

This shouldn't pose a major problem because there is usually a flood of seminars popping up to explain technologies that reach this level.

At this point, you can get by with people that are somewhat knowledgeable and have lower salary requirements, but you risk hiring someone who understands the technology at only a basic level and may not be able to help you use it to its fullest potential.

■ **Safe technology** — Technologies that reach this level have zero risk but offer no real competitive advantage.

In fact, you're expected to be using this type of technology and can be at a disadvantage if you're not.

Safe technologies are widely understood, too, enabling just about anyone to support them.

■ **Obsolete technology** — This type of technology can actually become a competitive disadvantage if you spend too much time and money to maintain and support it.

The technology itself is so generic that end users or third-party support providers can do a more economical job of implementing and supporting it.

Once you understand what type of technology you have, you can make sure you allocate your human resources and money in the ones that will give you the biggest payback, and those are embryonic, proven and accepted technologies.

Carlini is president of Carlini & Associates, Inc., a Hinsdale, Ill.-based consulting firm, and teaches information technology management at Northwestern University. He can be reached via the Internet at carlini@nwu.edu or by phone at (708) 986-1888.

Supporting staff

Here are some guidelines for choosing who you'll need to support technologies at various levels.

Technology	Staffing options
Embryonic	You'll need to team with independent consultants or the vendor to get someone who really understands the technology at this level. Using senior staff is a viable option, but it carries high training costs.
Proven	Using senior staff becomes more viable, but you'll still have high training costs. Independent or vendor consultants remain an option.
Accepted	On-staff support is a good choice here because affordable training programs and seminars become available when technology hits this level.
Safe	You may want to turn support for this type of technology over to knowledgeable end users or junior staff.
Obsolete	When technology hits this level, don't waste valuable staff supporting it. Opt for end users or a third party instead. Better yet, get rid of the technology.

SOURCE: CARLINI & ASSOCIATES, HINSDALE, ILL.

Data warehousing, net mgmt. to take center stage at shows

By Jim Brown

Here are some events to check out if you want to learn about new data storage and access models or an update on enterprise management technologies.

Digital Consulting, Inc.'s (DCI) Client/Server Solutions '95 Conference & Exposition, which will be held Sept. 19-21 in Toronto, has several data warehousing-related events.

CONFERENCE *planning*

For instance, there will be two session tracks devoted to the topic: one covering the technology's use as a business tool and another that explains a typical infrastructure.

In addition, there will be a daylong seminar covering on-line analytical processing (OLAP) technology, which gives end-user applications access to information stored in data warehouses.

DCI is also sponsoring the Data Warehousing Conference, which will be held Oct. 10-12 in Phoenix, with five conference tracks covering everything from managing large data warehouses to identifying decision support and other types of applications. An OLAP Forum will be held Oct. 9.

For more information, point your Web browser at http://www.DCIexpo.com or call DCI at (800) 324-3976.

Enterprise Management Summit '95, being held in Dallas, will feature a series of special events from Oct. 23-25, followed by two days of tutorials.

Among the special events is Summit Shoot-Out, in which eight vendors will show off their management skills as they rush to build an enterprise network during the course of the show.

The 12 tutorial topics run the gamut from systems and network management administration policies to integrating multivendor enterprise management solutions.

For more information, point your Web browser at http://www.summit.micromuse.com or call (800) 340-2111. ■

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You will prepare business cases (market size, target market share, competitive analyses, etc.); pricing; forecasting new products; and providing input to the company operating plan. Additionally, you will review market entry and product development opportunities as well as global demand generation. Requires a BSCS/EE, MBA or equivalent and minimum 3+ years' experience in networking, product marketing and/or business research/planning. Strong analytical, negotiation and executive level presentation skills are a must. **Job Code: PH4**

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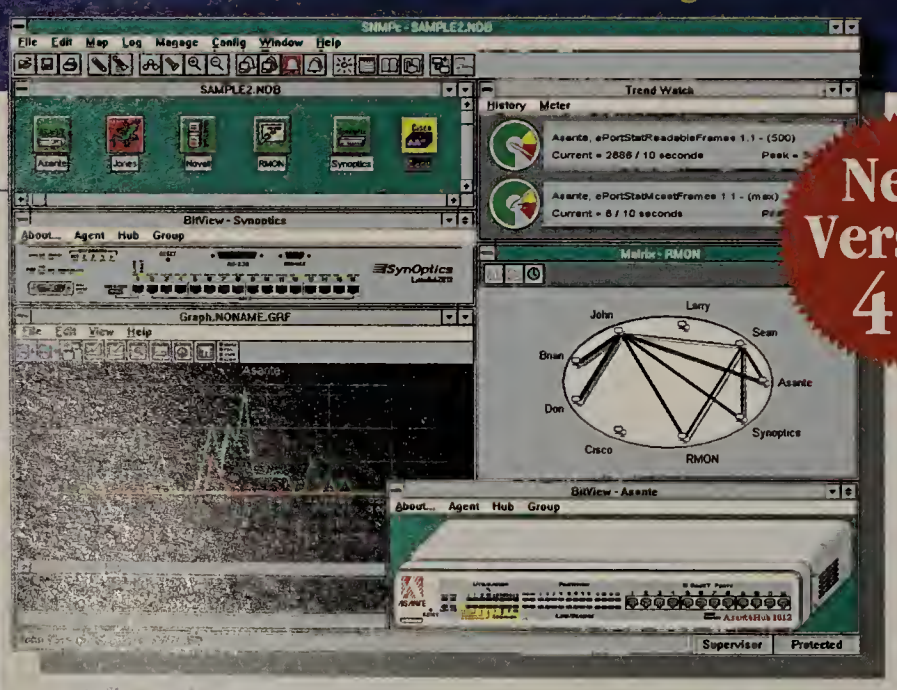
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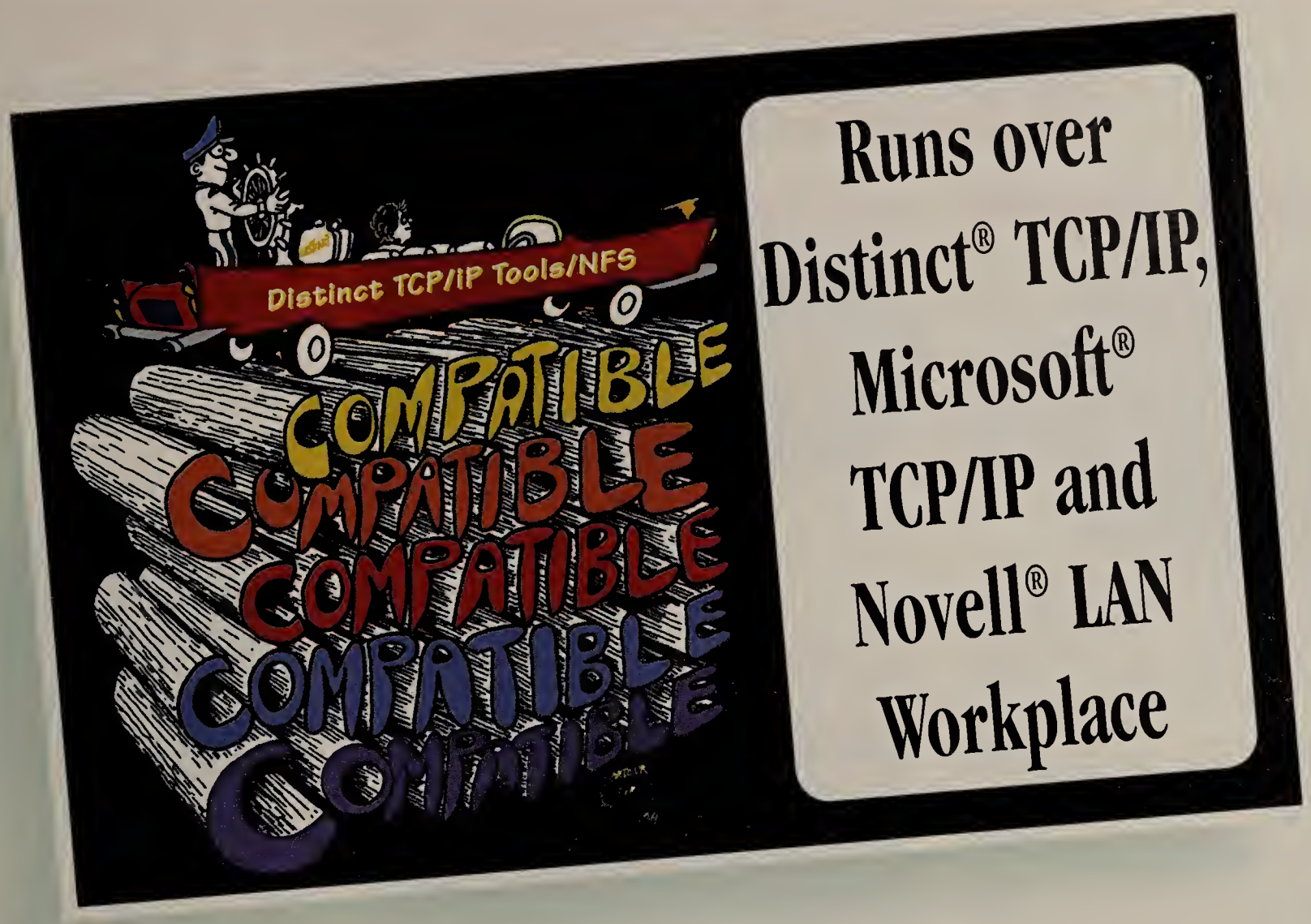
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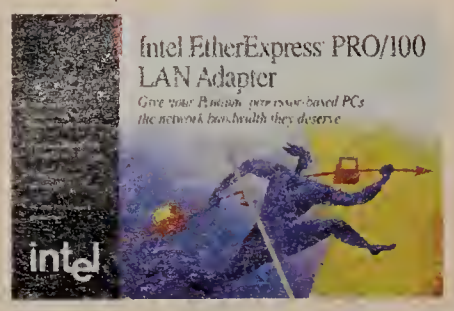
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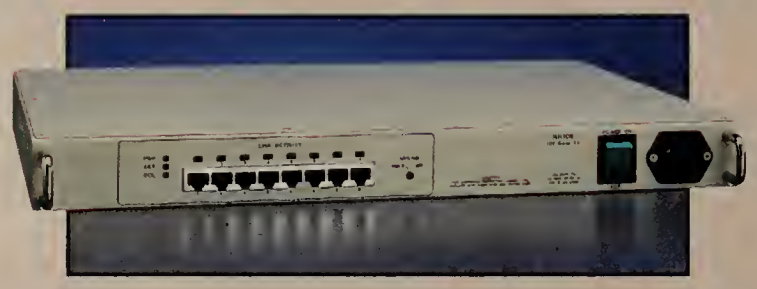
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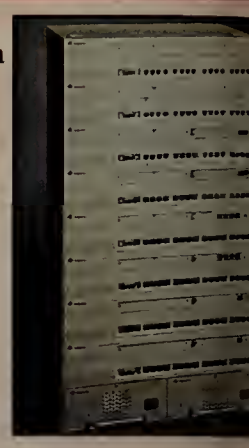
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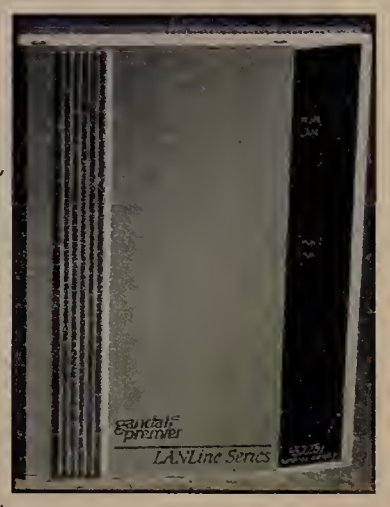
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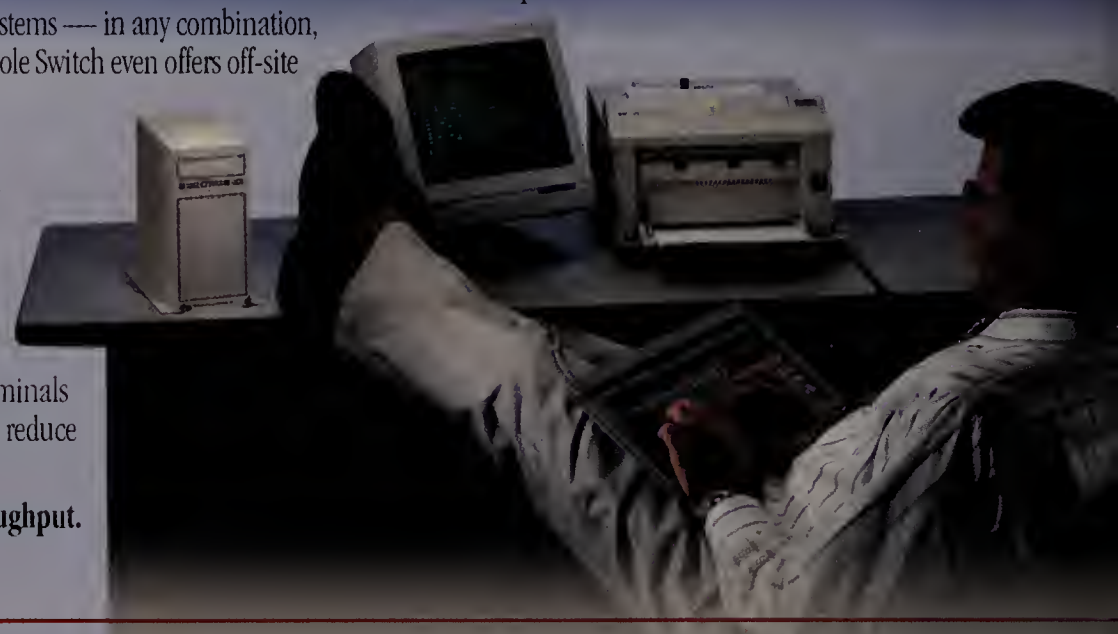
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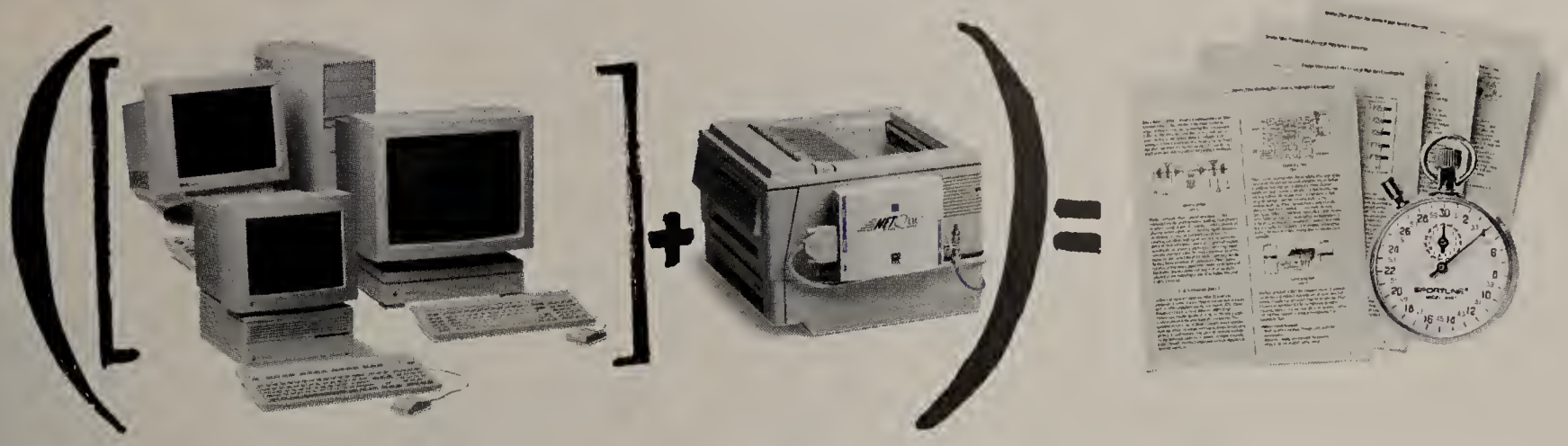
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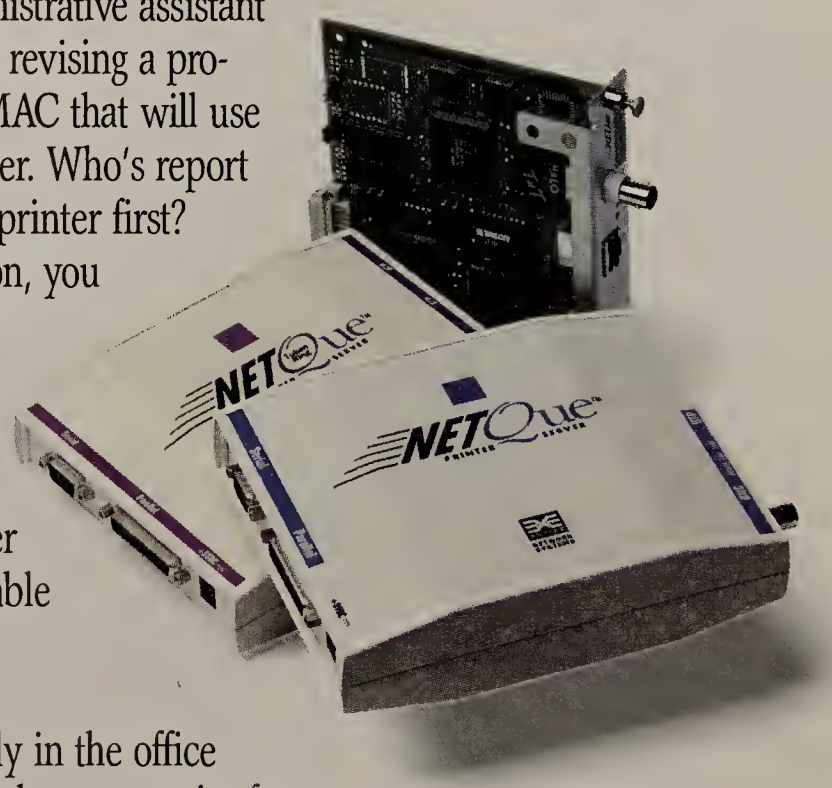
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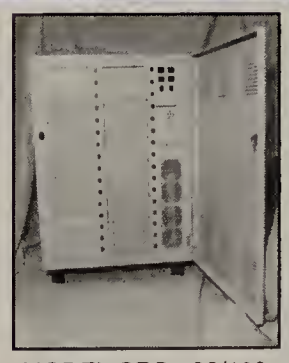
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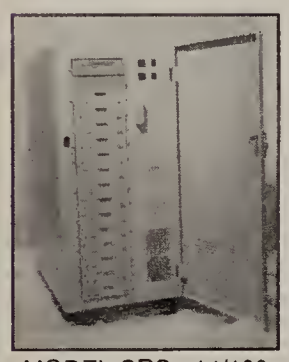
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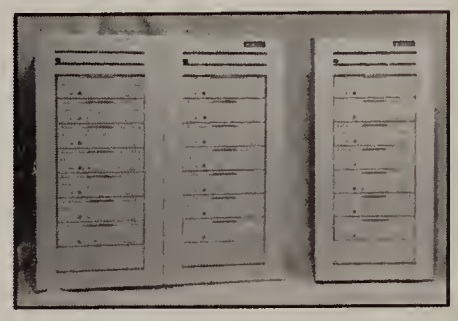
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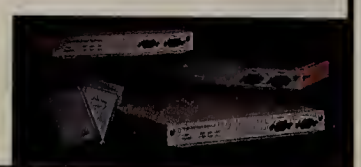
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Reader Service No. 239/FaxNET No. 30610

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Consolidate Multiple Backbone Rings into a Single, Multi-Gigabit Collapsed Backbone, and:

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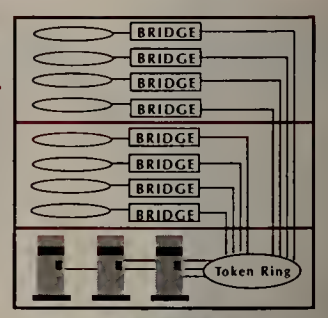
MAXNET is your Authorized Network Integrator for Bay Networks, Inc.

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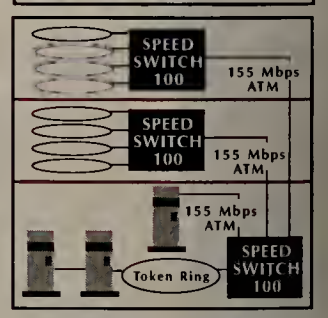
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Speed Switch™ 100

Before



After



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Reader Service No. 267

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Reader Service No. 250 / Faxnet No. 30580

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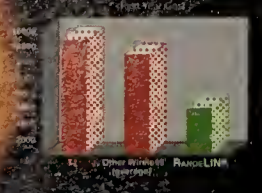
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Reader Service No. 219/FaxNET No. 30760

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What's the best way to run a UNIX program from a Windows PC?

TiP #6

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Reader Service No. 282/FaxNET No. 30540

CD-ROM server software that will send your network into overdrive. Not overload.

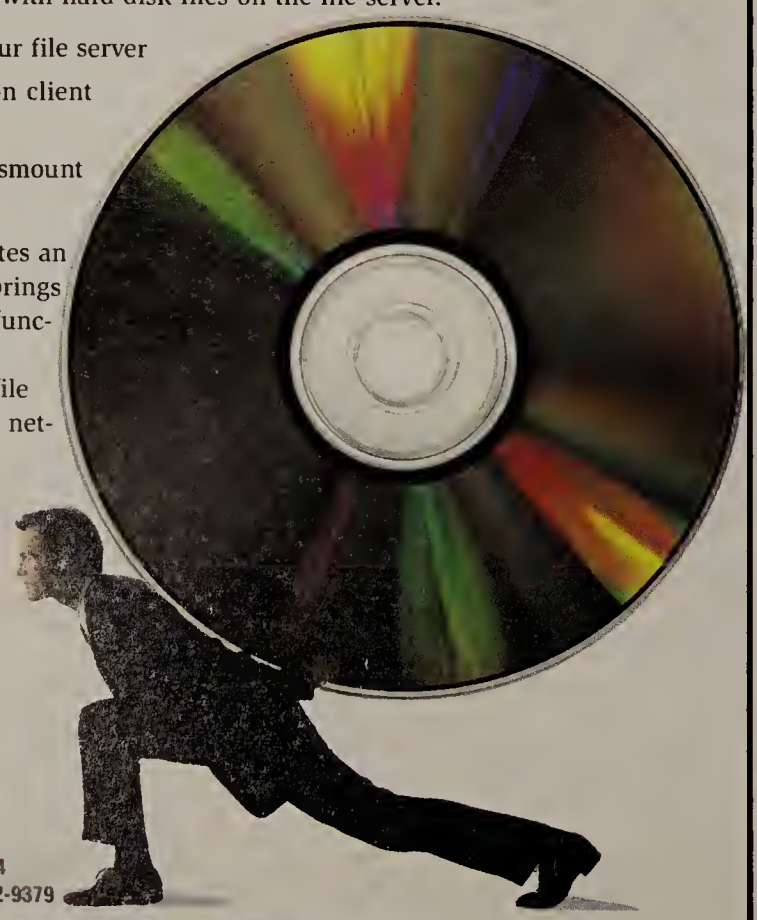
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Reader Service No. 254

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FaxNet
The instant fax response program that instantly faxes data sheets supplied by you, describing your company's product(s) to prospects who request information by simply dialing an 800 number. The prospects' company, name, phone number, and fax number are sent to you via fax every other week.

Reader Service
All Marketplace and ActionCenter ads receive Reader Service with Bingo Card Response. In addition, "Reader Requested" bonus leads from product categories of your choice are available.

NetActive
This interactive advertising forum from *Network World* allows advertisers to run a working demo or product description disk on-line which prospects can download and take for a test drive. Prospect name, title and address are captured and sent directly to you on labels every month.

Bonus Leads
Choose your company's product from Network World's subscriber "Plan to Purchase" categories and receive prospect names of those subscribers planning to purchase you product in the next 12 months. The number of leads you receive is determined by the length of your ad schedule. Names are taken from Network World's extensive 100% qualified subscriber base.

Call *Network World*'s Direct Response Advertising Department at (800) 622-1108 or (508) 875-6400 to put your dollars to work for you. Make your reservations today!

Joan Bayon Pinsky
Richard Black

Rina Campisano
Clare O'Brien

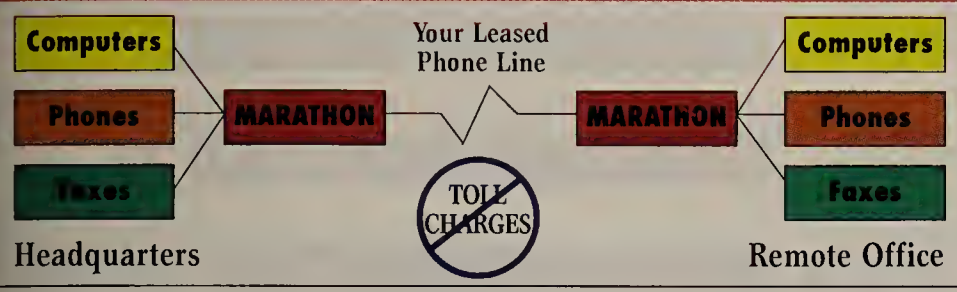
NetworkWorld Direct Response Advertising

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Specialists in Data Communications Equipment

Reader Service No. 236/FaxNET No. 30710



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PANIC?

Not with TeleProcessing's 8710! The 4 port FT1/T1 DSU, with 2 network management ports.

Dial-in back-up management from anywhere, from any device, to the control port (or run both management ports simultaneously-why wait until the network goes down).

Rapid remote node fault isolation- get that T1 span or equipment fixed fast!

DSU reconfiguration through async port; re-start management through SNMP port.

Plus! You don't lose a data port on the 8710 when you add TeleProcessing's drop-and-insert option!

ANOTHER Solely TeleProcessed NETWORK

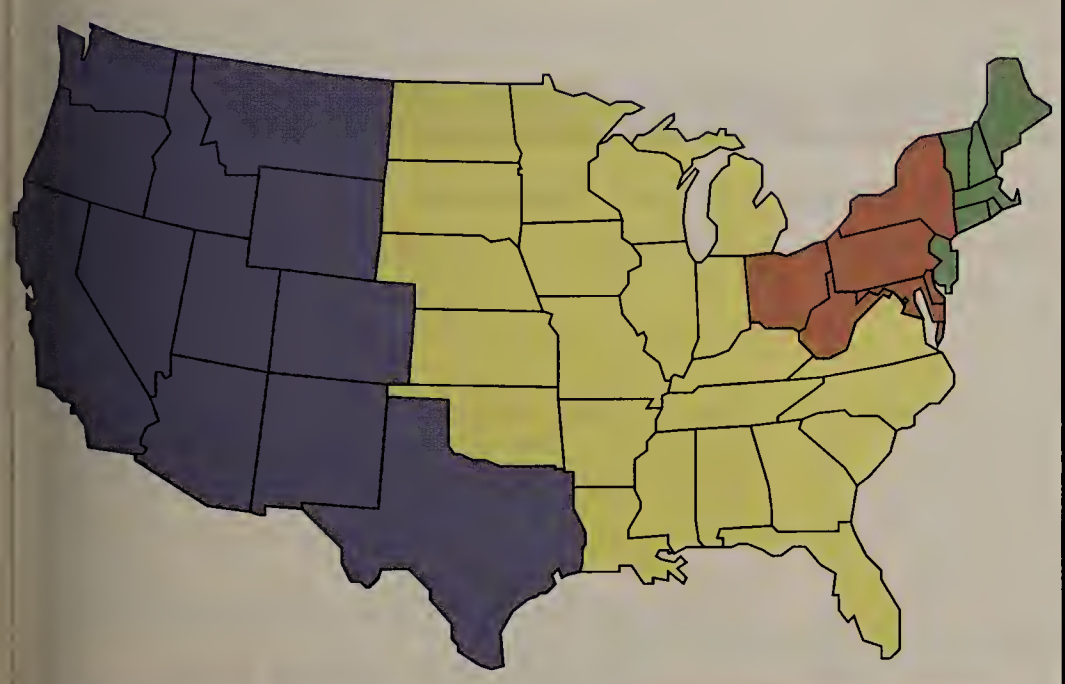


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Available on GSA Schedule. TeleProcessing Products is a woman owned small business.

Reader Service No. 248/FaxNET No. 30750

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Rina Campisano*

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* All inch Marketplace ads are handled by Rina.

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FREE Product Info

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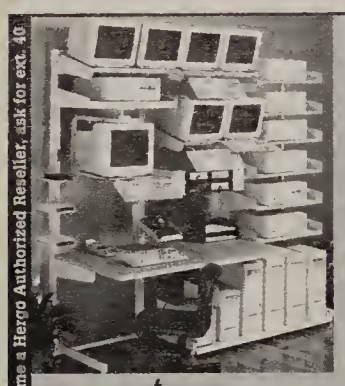
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Bay Networks	All	Call
Cabletron	New or Used	Call
CISCO SPECIALISTS		
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Network World readers spend MORE!

It's been confirmed yet again — this time by the results of Simmons CompPro III.



Among all network and LAN publications, *Network World* ranks #1 on average for total spending, network spending, PC spending and number of PCs acquired in the last 12 months.

Our readers not only outspent readers of other network and LAN publications — they also spent **MORE** on their networks in the last 12 months than readers of any of the other 47 publications and newspapers studied!

Source: Simmons CompPro III, 1995

Please send me information on advertising in the following:

Network World's *Direct Response Advertising*

❑ 4-Color Formatted Marketplace
❑ ActionCenter
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❑ B/W Marketplace

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$80 3C509-TP VISA MC

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VISA **RENT** MC
Reconditioned With Warranty
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CSU/DSU's • Channel Banks

CSU/DSU, ALL RATE, V.35/RS232	$99
Newbridge Channel Banks	$3995
Micom Marathon 1K, 5K, 10K	50% off
AT&T CSU/DSU NEW!	$275
T-1 CSU's	$359
CSU/DSU 56KBPS, V.35	$195
Telco Systems Channel Banks	$2995
Newbridge 3600 Modules	CALL
Datatel DSU/CSU 56KBPS	$375
AT&T Channel Banks	$2995
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Circle Reader Service No. 220

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Web Srvrs, Frame Relay, ISDN, PPP, Leased Lines, Security, SLIP, UUCP

For information on listing your service here, contact Rina Campisano at 800-622-1108x465, rcamp@nww.com

If you sell LAN Equipment or Services, *Network World* has 145,347* subscribers that you need to reach!

Number of subscribers who are involved in the purchase of the following LAN products:

Network Test Equipment	82,216
LAN Storage Device	98,472
SNMP Network Management	59,204
Cables, Connectors, Baluns	94,298
Network Adapter Boards	93,389
Hubs/Intelligent Hubs	87,388
LAN	128,766
UPS	89,202
ATM Switches	48,508

All information extracted from Dec. 1994 BPA Audit statement.

Would you like these numbers broken down by site purchasing influence? Call us, we will be happy to send you our Dec. 1994 BPA Audit statement.

Advertise in the Marketplace and make an impact on your sales!

For more information call Rina Campisano (800)622-1108

* Denotes number of non-duplicated responses to this category, recipients may have checked more than one sub-category.

Products purchased as a result of Marketplace ads.

- ✔ Hubs
- ✔ Routers
- ✔ Software training
- ✔ Memory products
- ✔ Ethernet Cards
- ✔ Netware products
- ✔ Modems
- ✔ Testing equipment
- ✔ Multiplexers
- ✔ Fileservers
- ✔ etc.
- ✔ etc.
- ✔ etc.

NOVELL ◆ NETWARE ◆ PROM PRICES

No. USER	Ver. 3.12	Ver. 4.1
5 user	$ 435.00	$ 435.00
10 user	$ 895.00	$ 995.00
25 user	$1,295.00	$1,395.00
50 user	$1,795.00	$1,895.00
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250 user	$3,895.00	$3,995.00

With each NETWARE purchase comes ONE FREE D-LINK DE-220 PCT Ethernet card "Windows 95 Ready"

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* Netware HOSTPRINT v.1.11 / 16-ses.	$ 645.00
* Netware Connect v.3.0 / 8-Port	$1,245.00
* LAN ANALYSER Windows v.2.1	$ 895.00

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NE2000 COMBO Comp	$ 28.00
3C509TP/ Compatible	$ 68.00
3C590 PCI/ Compatible	$145.00
DLINK-220PCT "Windows 95 ready"	$ 68.00
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8-Port 10BT - HUB	$135.00
12-Port 10BT - HUB	$225.00
16-Port 10BT - Stackable HUB	$295.00
12-Port SNMP Intelligent Slave HUB	$495.00

100 Mbps FAST ETHERNET

10/100 - RJ-45 / ISA	$ 155.00
100 BTX / RJ-45 / PCI	$ 225.00
8-Port 100BT - HUB	$1,395.00
12-Port 100BT - HUB	$1,995.00
100BT Repeater - 1640 Ft.	$ 595.00
100BT - RJ-45 Terminator (pair)	$ 25.00
100VG - AnyLAN / PCI	$ 195.00
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Circle Reader Service No. 221

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INTEL 8100 COMBO $70
NOVELL 8 PORT 10BT HUB $100

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P4116	$350
P4118	$400
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P7102	$400
P1390	$125
MORE!	CALL

NETWORTH (U)

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4000/3	$500
UTPM 12	$500
4000/ENT	CALL
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CABLETRON (U)

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TPTMIM	$600
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3Com 10-BASE T HUBS

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1627-1 12-port	$500
1637-1 24-port	$875
1603-0 SNMP	$350
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16671 24 port	$925
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2813-04	$850
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3002	$450
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# of users	3.12	4.1
5	$485	$495
10	$1075	$1075
25	$1475	$1475
50	$1875	$1875
100	$2675	$2675
250	$4675	$4675

3Com New 24 PORT 10BT HUB $700

NEW NETWORK INTERFACE CARDS

	3Com	SMC	INTEL	NOVELL	CLONE
16 BIT CX/TP	85	80	80	80	50
16 BIT COMBO	110	105	105	105	55
32 BIT CX/TP	195	225	225	425	80
TOKEN 16/4MB	250	250	250	250	250

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Circle Reader Service No. 271

FREE PRODUCT INFORMATION

Reader Service

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Mail to: Network World, PO Box 5090, Pittsfield, MA 01203 or FAX Network World at 413-637-4343

Expires 11/27/95

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109	110	111	112	113
114	115	116	117	118
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- **Key in advertisers "5" digit number listed below.**
- **You will receive requested information within minutes.**

COMPANY	PIN
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CNT/Brixton Systems Inc. (PU2.1)	34550
Cylink Corporation	34530
Dataprobe Inc.	34080
Network Dimension	30020
Complete index of advertisers	**99999**

Connectivity - Circle #109

MANAGE ACCESS TO SNA APPLICATIONS. FROM ANY PLATFORM.

Trying to manage access to SNA applications? Then use the most manageable *and* the most open SNA server—the BrxPU2.1 SNA Server from CNT/Brixton Systems.

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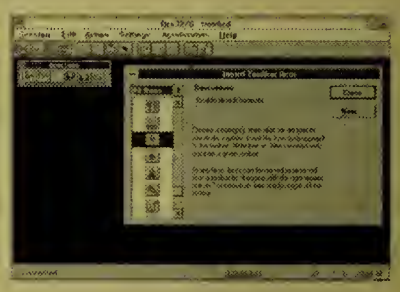
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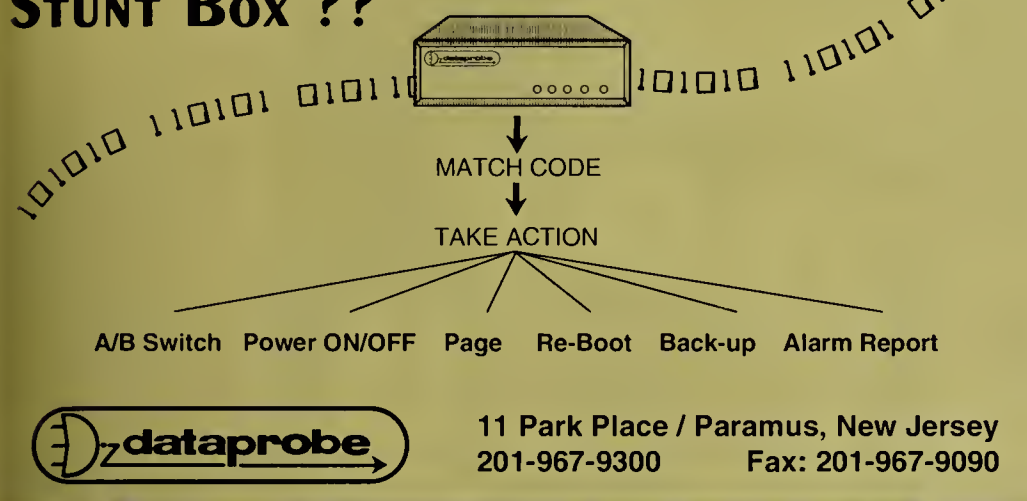
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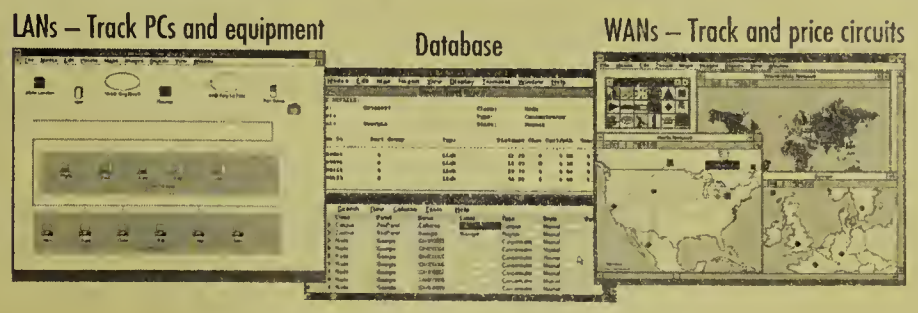
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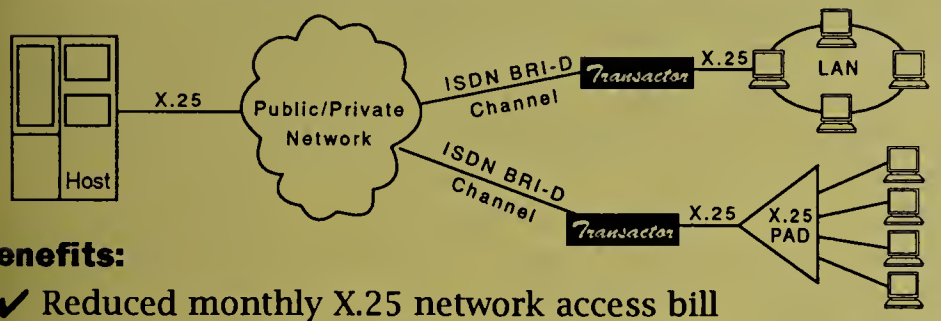
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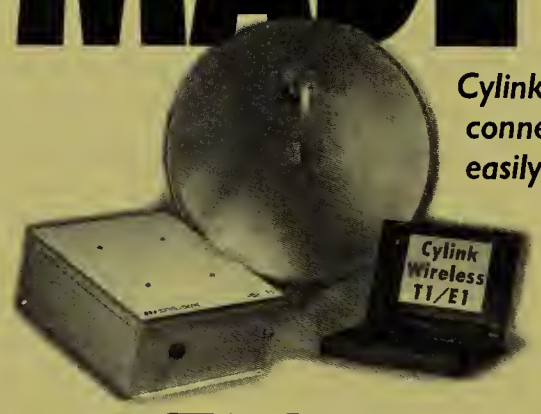
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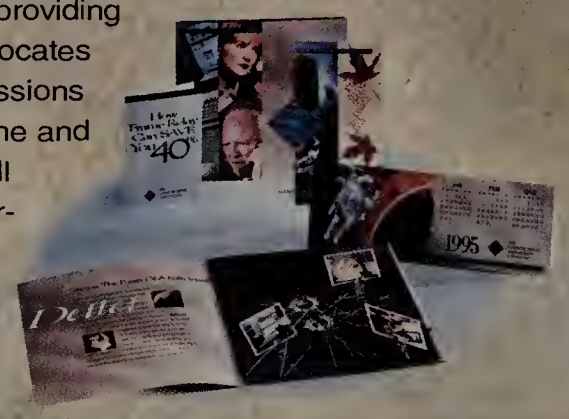
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Tuxedo

Continued from page 1

Novell plans to replace the name space in Tuxedo with NetWare Directory Services (NDS), a move that would give NetWare users point-and-click access to applications and processes running on as many as 36 different platforms.

The NDS tree

Under the plan, NetWare users would be able to click on objects in an NDS tree that represent processes or applications running on other servers. A NetWare Loadable Module version of Tuxedo, which is currently in beta testing, would take that command and route it to a Tuxedo module running on a remote server, which would launch the process and return the result to the NetWare server.

In reworking Tuxedo, Novell would be addressing the needs of users that believe NetWare is fine as a file and print server but would rather run heavy-duty applications on Unix or Windows NT within the same enterprise network.

Many users just are unwilling to wait two years until Novell delivers its next-generation SuperNOS, which will combine file and applications-serving features.

Under the plan, NetWare users would be able to click on objects in an NDS tree that represents processes or applications running on other servers.

"Tuxedo provides a good way of linking the two very different environments of network PCs and enterprise networks," according to Kent Lawson, president of Magna Software, Inc. in New York, which is porting its application development software to run with Tuxedo.

"This increases the scope of LANs and brings together the LAN with production application processing," he said.

Novell desperately needs to define a plan to integrate other operating systems into NetWare networks if it is going to stave off competition from Windows NT and make NetWare 4.1 as ubiquitous in enterprise networks as it is in LAN environments, analysts said.

Tuxedo also would provide the binding fabric across which Novell could offer its file and print, directory, security and other NetWare services, Novell officials said. In addition, it would be the basis of Novell's electronic commerce strategy, securely handling transactions from businesses and intelligent devices across the Internet, according to Novell officials.

The NDS connection

Integrating NDS with Tuxedo probably will require porting NDS to run natively on network operating systems other than NetWare, allowing non-Novell servers to appear as objects to be accessed and administered from within NDS, said Joe Menard, vice president and general manager of Novell's distributed services division.

Novell also will push Tuxedo as middleware that corporate and commercial developers can use to build three-tier applications accessible through NetWare but which do their heavy-duty processing on other platforms, Menard said.

"It's pretty neat," said Niraj Patel, network and telecommunications manager for GMAC Mortgage Co. in Elkins Park, Penn., who is evaluating Tuxedo in this role. "It means users can make calls to a queue, and they don't have to toggle from one application to another."

It looks as though using Tuxedo in such a role would improve system performance by not requiring users to maintain live sessions in Unix, Windows NT and NetWare simultaneously, Patel said.

Instead, users would rely on Tuxedo to queue and monitor calls to specific applications, he said.

Senior Writer Barb Cole contributed to this report.

Cisco

Continued from page 8

San Jose, Calif. "I don't know of anyone else that has anything like that yet."

Cisco also has added to IOS new "set" commands that let users establish routing policies when configuring their routers.

For WAN optimization with IOS, Cisco has added NetWare SPX spoofing, AppleTalk Name Binding Protocol (NBP) filters and floating static routes for AppleTalk and VINES traffic.

SPX spoofing enables routers to locally acknowledge NetWare "keep alive" packets so this traffic does not congest WAN links.

The AppleTalk NBP filters get rid of unwanted NBP traffic, which can chew up a lot of bandwidth during broadcasts. By filtering unwanted NBP traffic, IOS 11.0 enables users to better utilize network traffic and improve security by hiding AppleTalk devices, Cisco said.

The enhanced floating static route capability, which Cisco already supports for IP and IPX data, allows users to define in the routing tables a default dial-up path to be used as a last resort when a leased-line fails.

Lastly, for better security, Cisco has added route authentication and IP access list violation logging to IOS. Route authentication requires Cisco routers to provide an encrypted signature when sending routing table updates to other routers. This can help thwart spoofing, eavesdropping and intrusion.

IP access list violation logging helps users be more proactive when tracking intrusions. Usually, intrusive packets are discovered after they have already violated a net domain, when they are spotted by an administrator while scanning host log files.

The logging feature of IOS 11.0 records source, destination and port numbers of all incoming packets, the protocol type and any action taken to permit or deny access of traffic at the network perimeter. It then generates access list updates during regular time intervals so administrators can readily spot intrusive activity.

Cisco IOS 11.0 will be available in September.

Hardware highlights

Cisco's new 7500 router line features a series of enhancements on the hardware side that include integrated route/switch processors, interface cards that perform local route processing and a backplane that is scalable from 1G to 2.1G bit/sec. The interface cards, called Versatile Interface Processors, perform frame forwarding and local routing to ports on the same interface. Routing between interfaces is done by the route/switch processors.

The previous high-end offering, the 7000 line, had separate routing and switching processors, lacked local route processing on the interface cards and had a backplane that topped out at 533M bit/sec.

"The architecture of [the 7500] is designed for greater reliability and availability," said Vince Fuller, senior network architect for BBN Planet Corp. "It has greater capabilities for doing more complex routing calculations than the 7000 does."

©Cisco: (408) 526-4000.

Cabletron

Continued from page 1

end up buying another MMAC-Plus chassis," he said. "We're counting on the single-slot boards just to get the density in the chassis, plus we'd like the increased performance."

The switching modules, which are based on Cabletron's new Fast Packet Switch Application Specific Integrated Circuit, quadruple the maximum Ethernet port density of the MMAC-Plus to 336 ports per chassis and double the maximum number of FDDI ports to 28.

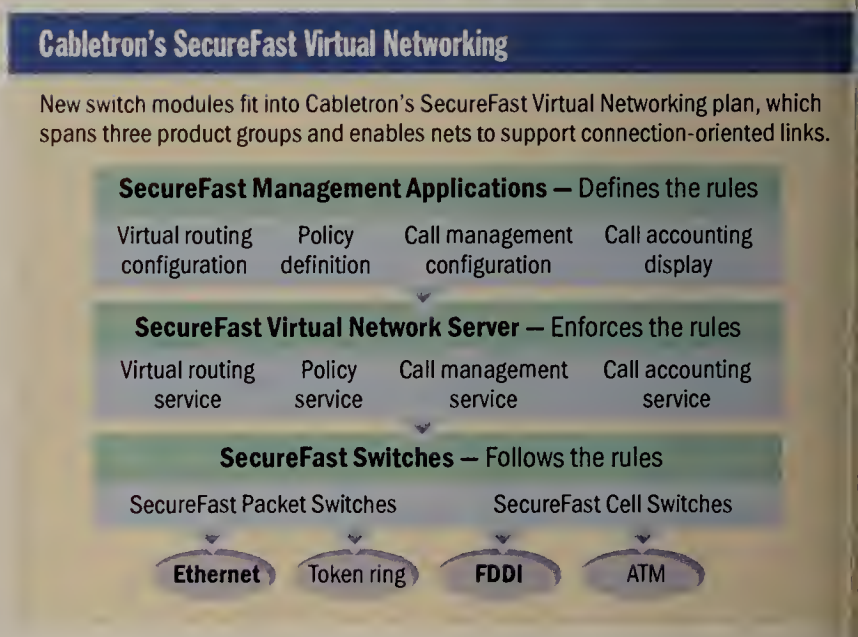
Michael Howard, president of Infonetics Research, Inc. in San Jose, Calif., said he is impressed with the performance capabilities of the new modules. "Because the modules connect to a 2G bit/sec backplane, they provide plenty of bandwidth to fill up the chassis with a lot of switched 10M bit/sec segment ports," he said. "That's what you need in a hub-of-hubs product."

In addition to jacking up port density and performance, Cabletron has jam-packed its new switch modules with management features, analysts said.

The modules support per-port Remote Monitoring, which makes it possible to collect network trend and analysis statistics from a central protocol analyzer.

The switches can be managed using local management tools or remotely controlled through any Simple Network Management Protocol-compliant network management system.

Although United's Cieszynski said he is interested in using the new FDDI switching module to free up a slot in his chassis for more switched Ethernet cards, he said he doubts United will use the new Ethernet switch due to its wiring requirements.



United "has standardized on RJ-45 connectors because they are modular and make it easy to swap devices around," he said. "But Cabletron's latest Ethernet switch module will use [RJ-71] front-panel connectors, which requires a second punch-down block."

Cieszynski said he figures Cabletron opted for the RJ-71 connectors because it could not fit all 24 RJ-45 ports and the associated circuitry in one panel.

Virtual networking

Like Cabletron's existing switches, the new switch modules support the company's SecureFast Virtual Networking capabilities. SecureFast consists of three product families that will be available by year-end: SecureFast Switches, SecureFast Virtual Server and SecureFast Management Applications. Together, the products enable the network to support point-to-point, connection-oriented links as compared to simply broadcasting addressed packets (see graphic).

For example, SecureFast requires a device trying to establish a session with another machine to check in to a Virtual Network Server for authorization. Once rights are determined, the link is established and packets are forwarded. There is no need to check each packet.

This method increases security by allowing the server to perform traditional router functions, while achieving high throughput by eliminating the need to look at each packet.

Sources said the company plans to announce in the next six months other switching modules for token-ring, fast Ethernet, 100VG-AnyLAN and ATM technologies, as well as release versions of the new Ethernet and FDDI switching modules for other MMAC devices.

The new FDDI switching module will cost $19,995; pricing for the Ethernet switching board has not been set. Both modules will be available by the end of the year.

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COMMENTS?

See "How to reach us" on the Opinions pages.

Auto giants

Continued from page 1

signed to lower costs and simplify networking for the industry, is still on the drawing board. But Ford is already putting the basic concept into action and will soon begin testing transmission of EDI messages with suppliers over a private IP network built by Ameritech Corp.

"Within the next 90 days, we will be transferring EDI data over IP," said Jim Sherman, Ford's EDI mailbox supervisor. Ultimately, he added, "we will be using TCP/IP for all our communications at Ford Motor."

Ford is writing the EDI-over-IP software itself. If the project is successful, Ford's suppliers may end up sending their EDI messages, such as material release and shipment notification, over an IP network instead of dialing into Ford's mailbox system.

"Our direct-dial today is only 9.6K bit/sec, which keeps suppliers on-line a long time," Sherman said. "The IP network should be less expensive for everyone."

Divided on X.400

The Automotive Industry Action Group (AIAG), the forum where industry communications standards are decided, last year endorsed IP as the lower layer communications protocol for the car business at its Auto-Tech '94 show. But fierce debate over the selection of an E-mail protocol has split the industry apart.

As part of the AIAG Electronic Mail Working Group, which was launched in 1993, Ford, LTV Steel Co. and Trinova Corp.'s Aeroquip Co. subsidiary called for use of the 1988 X.400 standard as the auto industry's E-mail standard.

At last year's Auto-Tech show, Gary Morin, manager of technical services at Aeroquip's automotive products group and chair of the AIAG E-mail working group, outlined the group's "X.400 Vision," calling X.400 all but a done deal.

But at next month's Auto-Tech '95, where the Big Three will detail network requirements for suppliers, it does not appear that X.400 will be high on the list. At best, X.400 will be eulogized by the AIAG E-mail workgroup as a good practice and a future direction in its "AIAG Recommended Business Practice for Electronic Mail" document.

Ford, changing its position, has joined Chrysler in asking the industry to choose the TCP/IP mail standard, the Simple Mail Transfer Protocol.

Moving to Notes

And insiders say GM recently surprised everyone by saying it intended to ask its suppliers to use Lotus Development Corp.'s Notes, which is spreading like wildfire throughout GM. GM's AIAG task force member Bob Bolo declined to comment.

"I applaud the SMTP part of this," said Margaret Hvatum, network administrator at Boston-based manufacturer Pollak Electromechanical Products, Inc., a supplier of components to the Big Three. "SMTP is an open systems standard that has been around long enough to have plenty of software choices in the market," she added.

But Hvatum said she regretted that the auto industry will have failed to reach a consensus if GM chooses Notes. The Big Three carmakers are so influential that their suppliers have to buy whatever is asked of them, she said.

Tom Hoy, GM manager and associate director of the AIAG, said the group is convinced that greater use of EDI and E-mail among suppliers for scheduling and shipment information will reduce the time involved in car assembly.

He agreed that multiple industry standards would be a burden to suppliers. ■

COMMENTS?

See "How to reach us" on the Opinions pages.

Warehousing

Continued from page 1

in New Orleans.

The utility, which is a conglomerate of electric companies, rolled out its first warehouse in 1993 and has come to rely on its system for the bulk of its financial reporting.

The warehouse gleans information weekly from a DB2-based reporting application running on a mainframe, as well as a Sybase SQL Server-based budgeting system.

Maturing Entergy

Hirstius said Entergy "has grown up a lot in terms of our ability to support data warehousing." For one thing, it created a design team that works with end users to develop strategic directions and requirements.

Prior to that, users could not be assured that the information they needed from the warehouse was available and accurate.

Data archeology

And the company is putting a lot of emphasis on what Hirstius called data archeology. This involves identifying data sources within the organization and developing a specification for how to move that data into the corporate-level decision-support system, Hirstius said.

Advocate Healthcare, Inc. in Oakbrook, Ill., which operates eight hospitals and maintains a data warehouse of patient information that is tapped by 50 users, also faces the prospect of significantly increasing the number of end users.

Sometime during the next year, the company will likely begin letting physicians and home health care agencies access the warehouse over the company's WAN, according to David Werdegar, senior database consultant at Advocate.

"We have a very productive WAN, but it probably would not support the added traffic; we may have to move to ATM," according to Werdegar.

Even before that, though, the company will have to look at changing the way it implements database security. Advocate needs to devise a security scheme that allows certain users to see, for example, valuable patient data but not patient names.

Tackling a big problem

Other companies have cured their data warehousing woes by implementing data marts — smaller, departmental databases that are kept in sync with a centralized data warehouse.

Hughes Space and Communications Co. in El Segundo, Calif., keeps its growing Sybase SQL Server data warehouse in check by taking commonly requested data and moving it to an off-hours decision-support application. Additionally, unused information is regularly discarded.

The data warehouse contains 25G bytes of procurement information collected from several relational and other databases around the company. About 5,000 employees access the warehouse to make better purchasing decisions.

But frequently requested information will be regularly offloaded to a reporting application running on the same Sun Microsystems, Inc. SPARC 2000 server as the warehouse. Users will be able to access these reports using their SQL-based tool with a few clicks of the mouse.

This will minimize the load on the data warehouse and make it easier for end users to retrieve the information, according to Gary Osborn, director of information technology at the Hughes division.

The Los Angeles Times Co. has also opted to segment its data warehouse for better performance. Its 1-year-old warehouse is used to track classified advertising and is directly accessed by only about 10 of the 85 users who rely on the information. The rest of the users receive weekly extracts from the centralized database downloaded to their PCs.

"Users can then query the information with little or no delay and are not impacted by the network or the server," said Rich Thayer, Advertising MIS manager at the Los Angeles Times.

The drawback to this approach is that users cannot plow through the 5G-byte database of detailed information. "There's a real trade-off between performance and giving users access to the data," Thayer said.

Nevertheless, analysts recommended dividing data warehouses into smaller pieces but said that approach raises questions about how to keep the distributed data in sync.

"I believe in breaking down the [data warehousing] problem into manageable pieces because global warehouses are too complex to manage and use," said Richard Finkelstein, president of Performance Computing in Chicago.

However, managing multiple databases and keeping them in sync requires better replication technology than is currently available, he said. ■

"We're looking forward to intelligent agents within software that help automate the decision making [within decision-support applications], plus big growth in the amount of data in and the number of users of our data warehouse."

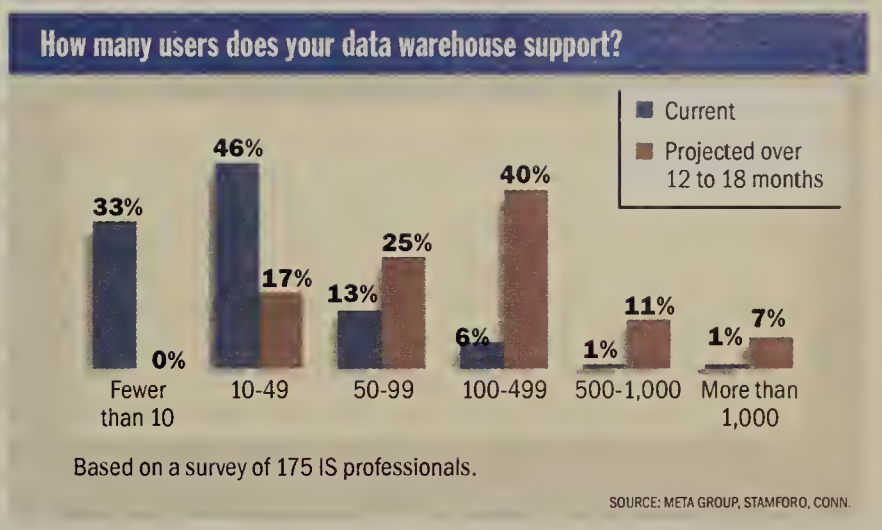
Barbara Hirstius, information technology consultant for data warehousing administration, Entergy

"We'll step back and look at all databases on the network, and try to detect overlap and duplication. Then, we'll migrate data from those smaller databases into our warehouse."

David Werdegar, senior database consultant, Advocate Healthcare

"Data warehouses are typically read-only, decision-support databases, but there's increasing pressure to provide more [detailed data in the warehouse] and greater currency."

Warren Thornthwaite, managing partner, InfoDynamics



APPN/ATM

Continued from page 6

ts Multiprotocol Over ATM (MPOA) work, but MPOA is nonths away from finalization.

"We will make code adjustnents to conform to MPOA nce it is established," IBM's Brotman said. "The MPOA work s not in conflict with what we are loing."

The HPR/ATM proposal is art of IBM's overall strategy to elp users migrate to switched echnologies. It is also an intearal part of the Switched Virtual letwork architecture IBM is xpected to announce this nonth, which will define how sers can group small or large umbers of users over the ATM ackbone.

Executives are still a little ketchy with details about the rchitecture, but the major rust of it will be to distribute puting functions amongst mulple processors (*NW*, Aug. 14, age 6). ■

Grand Junction rolls out fast E-net starter kit

By Jodi Cohen
Fremont, Calif.

Users waiting for prices to drop before implementing 100Base-T devices might want to check out a fast Ethernet starter kit introduced last week by Grand Junction, Inc. and Intel Corp. that costs less than $1,000.

Jim Metzler, an analyst at Strategic Networks, Inc. in Rockland, Mass., said the offer gives users a good place to start getting experience with 100Base-T technology at a reasonable price. "Grand Junction has the desire to accelerate fast Ethernet's acceptance, and this is a nice step in that direction," he said.

Fast Ethernet is used to boost performance for power users or server connections.

The kit includes Grand Junction's new FastHub 100 VL, a four-port 100Base-T repeater, and two 100Base-T Intel EtherExpress Pro/100 PCI adapters. The set costs about one-third less than if the products were purchased separately.

David Parter, network manager at the University of Wisconsin-Madison Computer Sciences Department, said he was impressed with the FastHub 100 VL, which he is beta-testing. "The four-port hub was not saturated by four nodes, so it will hold up very well for someone who's looking to put a few nodes of very intense traffic on it," he said.

The starter kit is priced at $995 and is available now.

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NetworkWorld

161 Worcester Road
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Global

Continued from page 8

site and monitors the customer premises equipment (CPE) from five service management centers (see graphic).

"They manage all the way down to the individual card [in the mux]," said Frank Troccoli, assistant vice president for product marketing at Newbridge. "They could even change a speed on the card."

By contrast, with recently launched competing services — such as Managed Bandwidth Service from MCI Communications Corp.'s Concert venture — CPE installation and monitoring are options.

Because management down to the mux is standard in the Global Managed Private Line offering, Cable & Wireless guarantees 99.9% availability, including the CPE and the local loop that is often not part of preplanned overlay networks.

"It's a fully preprovisioned net," said Gabe Battista, president of Cable & Wireless' U.S. carrier subsidiary, based here.

Dubbed Global Digital Highway, the Cable & Wireless' overlay takes advantage of the British parent company's long-standing equity stake in many national carriers, such as Hongkong Telecommunications, Ltd. and Japan's International Digital Communications, Inc. The locations where Global Managed Private Line is available make it particularly attractive to financial end users, Troccoli said.

Customers should be prepared to pay hefty sums for Global Managed Private Line. A 64K bit/sec circuit between San Francisco and Hong Kong, for example, will cost $10,800 per month. T-1 and E-1 speeds are available for much more. "It's a premium service," Battista said.

And despite the uniform billing, the pricing does not include the local loops, except in the U.K. The dual local loops required at each end of every private line as part of the service guarantee are still billed by national carriers. Also, other carriers with a head start over Carrier & Wireless may offer wider coverage or different net management features that would be attractive to particular users.

Concert's Managed Bandwidth Service, available in 12 countries, offers a remote digital loopback device that enables end-to-end testing of the leased circuit, even if Concert does not monitor the customer's on-site multiplexer.

"The customer doesn't have to worry about PTTs coming to their door unless we know the problem is [on their end]," said Linda Landwehr, senior manager for Concert Managed Bandwidth.

When the user requests carrier installation of a multiplexer, both Concert and Sprint offer IDNX Micro 20 from Network Equipment Technologies, Inc.

By contrast, AT&T's WorldSource Private Line, offered in partnership with a number of foreign carriers, is designed around a backbone net of Newbridge high-capacity bandwidth managers located at node locations of member carriers, with edge devices used to extend net functionality to user sites. ■

Multiplexing management

Under Cable & Wireless' Global Managed Private Line service, one of the following Newbridge Networks multiplexers is installed at each user site:

- **3600 MainStreet Bandwidth Manager**
- **3612 MainStreet Narrowband Multiplexer**
- **3624 MainStreet Intelligent T-1 Channel Bank**

Each Cable & Wireless network management center uses a Newbridge 4602 MainStreet Intelligent NetworkStation to perform bandwidth allocation, fault recovery and other monitoring of users' equipment.

DCE

Continued from page 1

rate the DCE client as a standard part of the operating system.

DCE is the Open Software Foundation, Inc.'s set of integrated directory, security and transport services for building distributed applications that can run across multiple operating systems.

Together, according to DCE advocates, these announcements highlight the fact that DCE today is capable of supporting large-scale distributed applications in multivendor environments. "We believe DCE is the only technology that can help our clients [achieve multiplatform interoperability]," according to Trevor Gee, principal of Deloitte & Touche LLP in Los Angeles. The consulting firm last week launched a service devoted to helping corporations build DCE-based computing infrastructures.

Canada's largest grocery chain, National Grocers Company, Ltd. of Toronto, decided two years ago to adopt DCE for that reason. "It was the only thing that had the stability and the growth potential to support three-tiered computing architectures," said Brad Brown, manager of technology development at National Grocers.

At the time, he said, Microsoft's OLE lacked direction and support for non-Microsoft environments. Also, Sun Microsystems, Inc.'s Distributed Object Environment had not been standardized, lacked the range of security features found in DCE and did not have broad vendor support.

"We believe DCE is the only technology that can help our clients achieve multiplatform interoperability," Deloitte & Touche's Gee said.

Obvious benefits

DCE's other benefits are starting to become more obvious, especially as tool vendors begin to introduce products that make programming easier, according to Brown. He noted that the DCE specification means any supported client can communicate with any supported server, regardless of the underlying programming language used.

"Some of the integrated tool sets, like Forte Software, Inc.'s Forte and Texas Instruments, Inc.'s Composer, require you to build everything in those tools," he said. "But with DCE, I can add Visual Basic Controls to make my client application easier to use or write a server applicaiton in [high-performance] C++ code."

DCE could begin to make inroads faster with Digital Equipment Corp.'s Sept. 21 release of DCE for Windows NT Version 1.1. The previous version offered only basic client capabilities and a software developers' kit.

The new release includes a cell directory server, security server and a graphical administration tool called DCE Director, all designed to exploit specific features of NT for workstations and servers. Digital soon will start beta-testing DCE client software for Windows 95.

Microsoft made changes to its Microsoft Remote Procedure Call (RPC), which is based on the DCE RPC, to ensure interoperability with the DCE counterpart, according to Steve LeBlanc, Digital's DCE product manager.

Both Digital and IBM revealed they are looking at ways to automate the installation of DCE infrastructure at customer sites. Digital, for example, exploited NT features to let DCE administrators remotely install DCE clients. That capability is being used, LeBlanc said, by a European telecommunications service to roll out DCE to 800 NT workstation clients.

Microsoft does not license any OSF code. But, besides implementing the DCE RPC on its own, it is also implementing the DCE security model, known as Kerberos. Warren Bernard, a technology manager at MCI Communications Corp. where DCE is being rolled out in applications serving the carrier's residential business, noted that a Digital and other vendors bring out DCE capabilities on Microsoft operating platforms, MIS groups can get what they need without Microsoft's active participation.

To dramatize the ease of implementing DCE, Open Horizon Corp. of Cambridge, Mass. announced at the show the Enterprise Accelerator Program through which it will incorporate DCE services into existing client/server applications using its Connection product.

Nicholas Zaldastani, president and chief executive officer of Open Horizon, promised his company would refund its $9,500 program fee if integration could not be done within five days. ■

Back to Reality

Computer crime fates an unhappy ending for life in a digital world

Professional storytellers usually conclude their tales with a happy ending. In the context of computer trade publications, "happy" means the story ends with a solution. "Raise all the technical problems you want," they say, "but don't leave the reader hanging."

Network managers are especially averse to unhappy endings.

Unsolved networking problems are rarely confined to one person. Like a virus, mysterious bogeys spread woe throughout organizations. Results vary from embarrassing to devastating, often weighted toward the latter.



David J. Buerger

This time, however, I'm going to break the rule. My topic — computer crime — has no simple solution. Not today, perhaps never.

Reluctance to admit the magnitude of computer crime stems from the digital world's machismo. Computers are instruments to control — stationary versions of a high-performance sports car. Technical challenges are just mental games, devoid of emotion, and limited strictly to techniques of manipulating ones and zeros. No problem is too great to resist another night of slick programming and a case of Jolt.

Technical wizards, however, often miss the point. Technology does not exist in a vacuum; it is used by people. And, as Albert Einstein said, "Technological progress is like an ax in the hands of a pathological criminal."

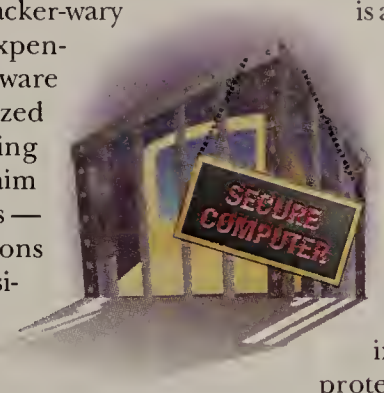
No one knows the extent of digital mischief. The feds peg the annual cost of data theft at $10 billion. Stray examples surface here and there, but most violations are kept secret.

Secrecy reigns for two reasons: Executives of ripped off corporations are embarrassed. And scared; shareholder lawsuits for negligence could cost more than theft.

Paranoia of network-based crime runs deep. Eugene Spafford, a computer security expert and associate professor of computer sciences at Purdue University, said, "The only truly secure system is one that is powered off, cast in a block of concrete and sealed in a lead-lined room with armed guards — and even then, I have my doubts."

Spafford's advice, of course, will not work in a digital economy. Commerce would halt if banks, brokers and other plugged-in merchants were to follow his advice — even at this early stage of the game.

The current rage by cracker-wary network managers is to buy expensive firewalls. Firewall software helps to keep unauthorized Internet users from penetrating private networks. Vendors claim they are effective, but hackers — who perform cracker-like actions with a sense of social responsibility — aren't impressed.



Secure Computing dared hundreds of hackers to break its firewall during a recent conference in Las Vegas. None succeeded, but one of the hacker organizers said some people did not want to expose their latest and greatest techniques and, thus, did not put forth great effort.

The hacker said if they had succeeded, it would have "caused a major event." Hackers are just as secretive of their success as net managers are of failure.

U.S. and French experts announced this month that they cracked Netscape Communications's 40-bit browser encryption software — so much for safeguarding credit card numbers.

Netscape uses a more secure 128-bit encryption key in its U.S. product. Uncle Sam, which had restricted the export version to 40 bits, just eased the rule to 64 bits. Reluctantly. Beltway control freaks can't stand the thought of someone transmitting unbreakable secrets, as if they had any themselves.

Powerful encryption software is available now. Some packages, such as Pretty Good Privacy, are free. The real problem is artificial since various governments restrict the use of encryption software.

But Uncle Sam acted in predictable fashion this month when the Senate passed an amendment "to require the President to begin the process of developing a national policy to protect the nation's information systems, including defense, telephone, public utility and banking systems." Crackers' response: "Ooh, we're scared!"

External threats, however, pale to mischief caused by insiders. One ticked-off, authorized user wreaks far more havoc than a thousand hackers.

Consider the trove of private information that can be hawked to "authorized" bidders.

Little can stop bureau customers' employees from snooping for private information. If Internal Revenue Service clerks can do it, why can't they? Perpetrators can get caught, but my guess is that most do not.

There is no easy answer to quell data snooping and thievery. Technology can help. Legislation probably will not make a dent. Life in the digital world may not end happily ever after.

Buerger is an Atlanta-based writer and industry consultant. He can be reached at dbuerger@pipeline.com.

CyberSpeak

Voices from the reader network

NEXT QUESTION

What do you hope to get out of the NetWorld+Interop show?

Responses due by 8 p.m. Thursday, September 7. You'll get a T-shirt if we print your response. Please include your name, title, company and address.

Windows 95 has arrived at last. Do you think it lives up to all of the hype?

"Hell no! How could it? It is the biggest software rollout and advertising budget ever for a software program, yet it is a copy of what is already out there, has been out there for years, and is proven and tested. OS/2 Warp is everything Windows 95 is and more. The only problem is that IBM still does not have a clue on how to market it. They are getting better, but they still have a lot to learn."
Dennis Morien, president, D.R. Morien Software Consulting, Boynton Beach, Fla.

"Windows 95 reduces hair loss. Finally, I can run five or six Windows apps without running out of system resources, and I don't receive tech support calls every time a user wants to install a modem or sound card. I was lucky since I already had 16M bytes of RAM installed. If only Microsoft would package RAM upgrade coupons rather than spending millions on Rolling Stones royalties. Doesn't Bill know Stones and Windows don't go well together?"
Bradley Bull, system manager, Salem Radio Representatives, Irving, Texas

"Can anything except a cure for cancer or AIDS live up to the amount of hype that this has generated? It's a network operating system, not a candidate for the Nobel Peace Prize. Let's keep it in perspective."
Denise Doege, receptionist, Computer Resource Associates of Wisconsin, Inc. Milwaukee

"No, Windows 95 is not the Holy Grail of OSes. But it is a far cry better than Windows 3.1. It's nice to see general protection faults every other day instead of every other hour."
Clay Boyce, PC network administrator, Media Services, Inc., Birmingham, Ala.

You're finishing a presentation



on Lotus Freelance Graphics,



printing a report on your boss' desk,



and browsing the Internet



all at the same time.



Is it the espresso or OS/2 Warp Connect?

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IBM

Solutions for a small planet™

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- John McConnell
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